AVIATION WEEK

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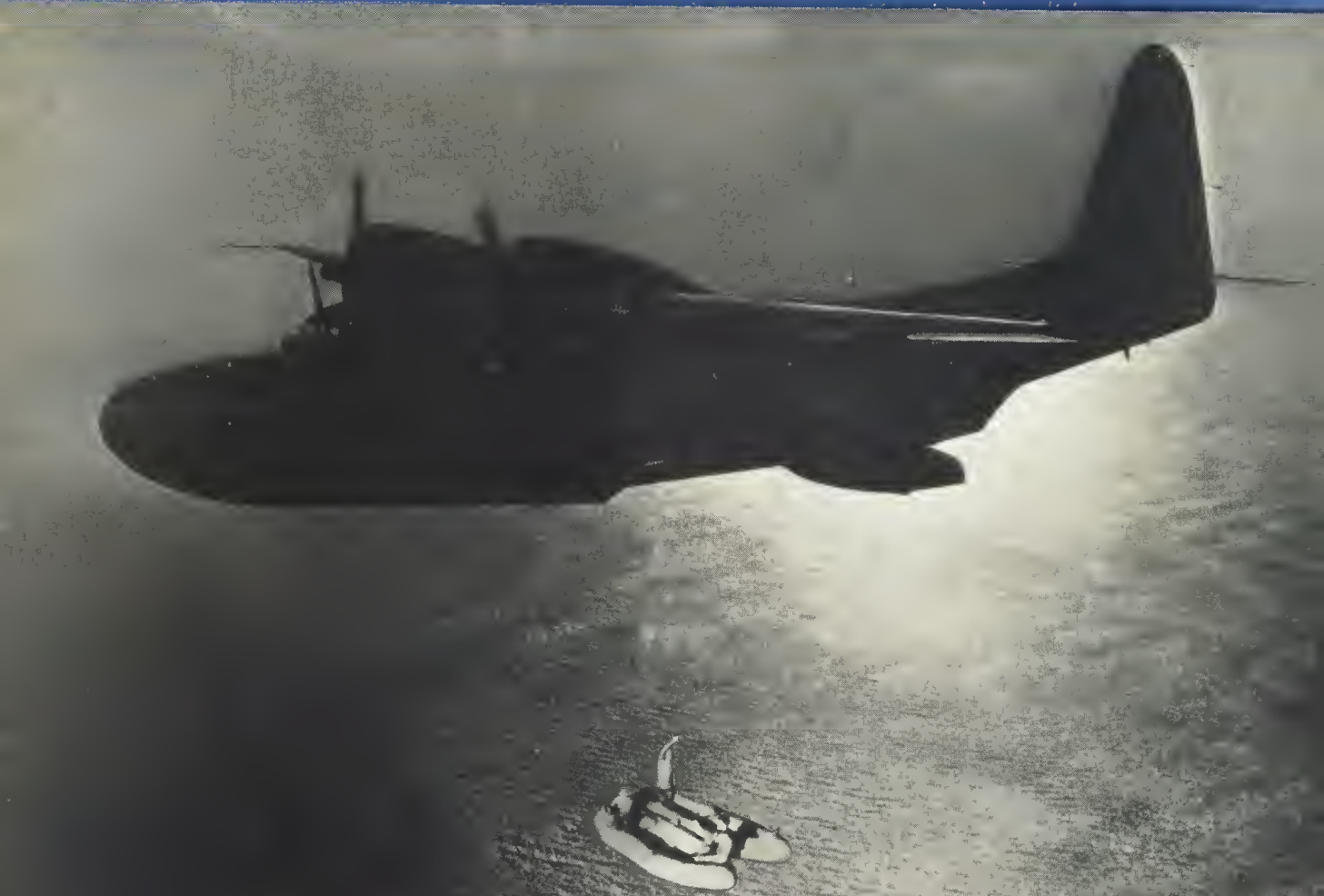

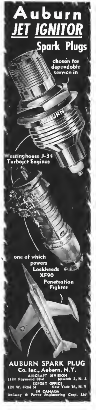

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REPUBLIC AVIATION

17 YEARS

FAFNIR

Republic, maker of mighty Thunderbolts and Thunderjets, excels in producing ships that fly with a minimum of time off for service or overhaul Its Thunderjet is believed to require less maintenance than any other jet now in service For such performance, an uncompromising standard from blueprint to test flight is essential Fafnir Aircraft Bearings have flown on Republic Ships for 17 years Something more than good ball bearings is needed to maintain this long association It s a Fafnir attitude and aptitude a way of looking at ball bearings from the designer's side, an aptitude gained from more than twenty years specialization in aircraft ball bearings The Fafnir Bearing Company, New Britain, Connecticut

Fafnir Double Row, Self-Aligning Ball Bearing (DSP Series), one of the Fafnir Ball Bearing units regularly specified by Republic Light, compact design incorporating the efficient Fafnir Plya-Seal Bearings prepacked with lubricant to Air Force and Navy Specifications Self-Alignment achieved through double row of balls operating on a spherical surface in the outer ring Inner race extension beyond face obviates need of spacers

NEWS DIGEST

DOMESTIC

CAA, CAB and NPA have agreed on action to insure U S airlines new planes and parts to maintain operations. Critical emergency items needed by airlines will be screened by CAA and then submitted to NPA for issuance of directives as necessary to suppliers approving production and delivery of necessary equipment. CAA-CAB will negotiate directly with the military in programming plane and part production, including electronic gear. International airlines will be handled by CAA-CAB, ECA and Commerce and State Departments.

Personal and executive plane exports of 5000 lb and less for October by nine companies totaled 86 valued at $288,509, compared with 37 planes worth $240,438 reported by nine companies for the previous month. Turkey was by far the largest buyer, taking 50 planes at $120,000. Greece was next, taking 18 worth $43,200.

Three Grumann SA-16 amphibians recently made a 2400-mi flight from California to Hickam AFB, Hawaii. No special gear was carried for the flight, but the planes were fitted with new-type wing float fuel cells plus droppable auxiliary wing tanks.

Navy has awarded a contract for installation of a 132,000 volt underground electrical system at Naval Aero Turbine Laboratory, Trenton, N J., to Plymouth Electrical Construction Co., Inc., Washington, D C. The firm's bid was $228,000. The lab, which will cost $22 million when completed, will test gas turbines at simulated altitudes up to 65,000 ft.

Last F-86A Sabre was delivered on schedule to USAF by North American Aviation. The company is already in production at Los Angeles on the F-86D all-weather fighter, and the F-86E, which features control improvements, including controllable horizontal tail surfaces.

Critical shortage of aeronautical engineers is highlighted by Republic Aviation Corp., offering to take on men with architectural, electrical, civil and mechanical engineering specializations and give them on-the-job training to adapt their skills to aviation work. The firm's immediate requirements call for nearly 200 engineers and about 1500 other employes. The company sees its employment figure going up from the present 6500 to over 9500 by 1952.

Three Lockheed F-94 all-weather fighters successfully completed a severe accelerated test program at Edwards AFB, Muroc, which entailed cramming six months of flying into a month. The three planes flew continuously using shifts of pilots and ground crews. Highly significant was the fact that the F-94S completed their program without change of a single engine or afterburner.

American Society of Travel Agents asks CAB that only regular certificated airlines and authorized agents be permitted to arrange overseas air excursions from U S. ASTA claims this would end such occurrences as the stranding of student travelers this summer.

FINANCIAL

Ryan Aeronautical Co. has declared a ten cents per share cash dividend, payable Dec. 27, to stockholders of record Dec. 12. Ryan directors announced the board's intention to make quarterly dividend payments.

Stewart-Warner Corp. has voted a quarterly cash dividend of 35 cents per share, payable Jan. 6, and a year-end cash dividend of 50 cents, payable Dec. 27, to stockholders of record as of Dec. 8. The firm paid 25 cent dividends on Jan. 7, April 8, July 8, and Oct. 7.

INTERNATIONAL

British exports for October totaled slightly over $7 million and included 55 complete planes, 132 engines, 1746 tires, and nearly $3.5 million worth of accessories. Imports included five complete planes valued at $150,560 and slightly over $2.5 million worth of accessories.

IATA Clearing House turnover for August reflected continued increases in summer international airline traffic with figure of $13,495,000 compared with $12,649,000 for the same month in 1949. The Clearing House was able to retire 82 percent of all August transactions without necessity of cash payment or foreign exchange purchase. This was done by offsetting credit and debit accounts of its 35 members.

De Havilland Comet will be tested with axial-flow engines replacing its present centrifugal DH Ghost engines. De Havilland's aim is to get more power in the Comet and present an "alternative model for the very long world stages."

AVIATION CALENDAR

Nov 29-Dec. 13—Second annual nuclear science seminar, Oak Ridge, Tenn. For admission apply to Lt. Comdr. D. J. Mullon, USNR, Oak Ridge.

Dec. 7-9—Meeting of California Assn. of Airport Executives, Hotel Oaks, Chico, Calif.

Dec. 8—Aviation Associates show and dance, Town Hall, Philadelphia.

Dec. 16—14th Wright Brothers Lecture, Institute of Aeronautical Sciences, U. S. Chamber of Commerce Auditorium, Washington, D. C.

Dec. 16—Annual Wright Day dinner of the Aero Club of Washington, Presidential Room, Statler Hotel, Washington, D. C.

Jan. 2-7, 1951—Miami Aviation Week, Miami, Fla.

Jan. 5-6—Third annual Kansas aerial spray conference, engineering lecture hall, Kansas State College, Manhattan, Kan.

Jan. 6-7—Florida Air Pilots Assn. air show and exposition of planes and equipment, Opa Locka Auport, Miami, Fla.

Jan. 8-10—Eighth annual air cruise Miami-Havana and return of Florida Air Pilots Assn.

Jan. 15-18—Plant maintenance show and concurrent conference on plant maintenance techniques, Cleveland, Ohio.

Jan. 21—Air education day, sponsored by the Palm Springs Junior Chamber of Commerce, Palm Springs Airport, Calif.

Jan. 22-26—Winter general meeting, American Institute of Electrical Engineers, Hotel Statler, New York.

Jan. 29-Feb. 1—19th annual meeting of the Institute of Aeronautical Sciences, Hotel Astor, N. Y.

Feb. 19-20—Meeting covering agricultural research as related to aviation, sponsored by the Flying Farmers of America, Memphis.

Mar. 16—Sixth annual flight propulsion meeting, Institute of Aeronautical Sciences, Hotel Carter, Cleveland.

Mar. 19-23—Seventh Western Metal Exposition, Oakland Auditorium and Exposition Hall, Oakland, Calif.

Apr. 24-26—ATA annual engineering and maintenance conference, Hotel Duke, Chicago.

May 17-19—Annual convention of the Women's Aeronautical Assn. of the U. S., Little Rock, Ark.

June 11-15—Second annual conference on industrial research, conducted by Columbia University Dept. of Industrial Engineering, New York.

June 15-July 1—International aviation display, Grand Palais and Le Bourget Airport, Paris.

June 25-29—1951 summer general meeting of the American Institute of Electrical Engineers, Royal York Hotel, Toronto.

PICTURE CREDITS

9—(top) McGraw-Hill World News (center) Cessna Aircraft Co. (bottom left) Glenn L. Martin Co. (bottom right) Howard Levy; 12—(top) Dept. of Defense (lower) Republic Aircraft. 13—United Air Lines. 14—Piper Aircraft. 15—Wide World. 21-22 General Electric Corp., 28 North American Aviation. 31-38 McGraw-Hill World News.

TRANSPORTING SAPPHIRES—Neatly fitted 7200-lb.-thrust Armstrong Siddeley Sapphire turbojets replace outboard Bristol piston engines on this four-engine Handley Page Hastings transport. On half the jet's power, plane reached 1000 ft. in 30 sec.

Aviation News Picture Highlights

ARMY TAKES DOUBLE PORTION—U. S. Army has doubled its previous big order (up to 500 planes) for Cessna's trim little L-19 reconnaissance plane powered by the new 213 hp. Continental. Wichita company delivered first production plane ahead of schedule.

GAME BIRD—Martin's KDM-1 radio-controlled target missile. Plover under wing of Navy JD-1.

FRENCH COPTER—Sud Est SE 3110 two seater has 203 hp. Salmson, butterfly tail rotors.

WHO'S WHERE

In the Front Office

Arthur E Raabe, a Bendix Aviation Corp vice president, has been made general manager of the Eclipse Pioneer division The appointment cases the load on Raymond P Lansing, Bendix vice president and group executive in charge of Eclipse Pioneer, Scintilla Magneto division at Sidney, N Y, the Red Bank division, and Friez Instrument division, Baltimore. He has been, in addition, general manager of Eclipse Pioneer Raabe has been a Bendix executive since 1929

Changes

R G (Reggie) Clarke has been named general superintendent and plant manager of the Columbus Ohio plant North American Aviation recently acquired from Curtiss-Wright Temporary assignments at the new NAA facility include R H Kemp, chief engineer and J C Newton chief of materiel Harry Rankin has been named chief inspector, H E. Gregg, personnel manager and J S Mathews, director of labor relations

T. T. Hinman has been appointed manager of military sales and Max Helzel manager of commercial sales for Lockheed Aircraft Service, Inc Helzel will operate at N Y International Airport and Hinman will work out of Washington, D C Both jobs were previously handled by George C. Stewart, who has resigned to become eastern representative in Washington for Fletcher Aircraft.

Honors and Elections

S & W HONORED—Seaboard & Western Airlines' president, Ray Norden (left), holds ment award presented to carrier by Reserve Officers Assn for contributions "to the national defense by providing logistical support to the USAF in connection with the Berlin Airlift in 1948 and during the UN action in Korea." At Norden's left is Lt Col W E Hopper, Jr., head of ROA's Manhattan, N Y. chapter, and Brig Gen D B Adams, of the 1303 Logistical Division.

INDUSTRY OBSERVER

► Initial programmed cost of a minimum radar net for the North American continent—up the West Coast, across the Alaskan-Canadian polar frontiers and along our East Coast—will cost upward of $5 billion, according to a recent Pentagon forecast. The figure does not include personnel training nor annual maintenance Radar detection stations already ring vital continental U S areas in an "island" system of defense Armed fighters of Eastern and Western Air Defense forces are now challenging "unidentified" or "off pre-determined course" aircraft flying near these areas. So far, investigation has shown challenged planes to be friendly.

► Entire lateral tail surfaces of North American F-86E are controllable to give the aircraft finer longitudinal control at high subsonic speed Control of ailerons, rudder and the all movable tail surfaces is maintained through an independent power source instead of the conventional power "boost" system, to give a more positive control Named "irreversible control," the new system eliminates the tendency of conventional systems to neutralize as air loads beat down upon the surfaces in flight

► Third prototype of the British-built Saro SR/A1 jet flying boat is now undergoing flight tests to provide U.S. and British governments operational combat possibilities of the fighter flying boats Following completion of the combat series, the plane will undergo additional tests in evaluation of flight characteristics for U. S. Navy BuAer SR/A1 is a single-seat fighter powered by two 4000-lb thrust Metrovick Beryl turbines Armament is four 20mm nose cannon, two 1000-lb bombs or eight 5-in rockets. Plane has a combat endurance of 1 hour, twice that with use of external fuel tanks. First two planes crashed during tests.

► Air Force has 40,000 units of high intensity runway lights on current order, expected to fill USAF needs for this type of lighting through 1952 Total dollar volume exceeds $735,000.

► Lighting equipment builders are struggling to meet USAF requirements for high intensity approach lights Present equipment has been ruled out for military landing fields because of the obstruction hazard they present to jet aircraft. Units in operation in continental U. S and abroad are for experimental use only.

► Taxi tests of the French SO 4000 twin jet bomber have been resumed at Orleans Bricy Airfield Taxi tests were halted after collapse of the nose wheel of the tricycle landing gear Powered by two Hispano-Suiza Nene gas turbines, SO-4000 has a wingspan of 58 ft 6 in, length of 64 ft 9 in Design performance specs call for speed of 516 mph at sea level

► Canadian National Research Council is testing aircraft skis designed to eliminate two major difficulties of snow operation in the far north—sliding resistance and adhesion Sliding resistance of present aircraft skis on snow is sometimes so great that it is impossible to reach flying speed, the Council reports Similarly, when skis remain stationary on snow for even a few seconds, adherence is often so great that it is almost impossible to break them free

► Negotiations are in final stage for lease of the Globe Aircraft plant, Ft Worth, Tex., by Bell Aircraft to build B-36 and B-47 jet engine nacelles for Convair and Boeing The 78,000 sq ft plant occupies 155 acres Bell plans to employ 400 persons at the plant now used as a Government Services Administration storage depot Plan already has Munitions Board approval and awaits final OK by GSA Package nacelles will include complete powerplants for the B-47 and B-36 The Globe plant is under Navy cognizance

► Although Ryan Aeronautical has announced it will discontinue Navion production after turning out 150 new models, the company is going ahead with plans to certificate a new model of the four-place plane at 3200 lb—up about 300 lb over the present model The new model will be designated Navion C, and Ryan hopes for certification in about nine months

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Foreign Aid Jet Plane Deliveries Speeded

F-86 and F-84 to be shipped in quantity to France, England.

F-86 SABRES will be built in France although 500 made in U S will go to Britain

F-84 THUNDERJETS will go to France and Italy, with 800 shipped by end of 1952

Top officials of the Defense and State Departments are secretly pushing a general speed up in re-armament of Western Europe under the Mutual Defense Assistance Program, with heavy shipments of jet fighters starting immediately

• **Nearly 500 F-86 Sabres** will go to Britain's Royal Air Force, and eventually the plane will be manufactured in France.

• **About 300 F-84 Thunderjets** will be shipped to European nations next year, with approximately 800 of this type expected to be in French and Italian hands by the end of 1952.

Deliveries of aircraft, shares and equipment under MDAP are moving into high gear. By next September it is anticipated that the halfway mark will be reached in the $1-billion-plus program.

The U. S. contribution of aviation aid to MDAP nations totals $1,150,596,849 and stems from three sources

• **Air Force**, responsible for the lion's share, has earmarked $1,113,442,117 from its fiscal 1951 appropriation

• **Navy** is putting up $30,061,588 out of its fiscal 1951 funds

• **Army** is committing $5,093,144 of its fiscal 1951 funds for purchase of liaison aircraft

The Defense and State Departments have ordered the MDAP deliveries speeded up in an attempt to beat the spiraling costs of materiel shortages in major raw materials, and the increasing tension—economic, military and political in that area.

But a deterrent to rapid acceleration of MDAP is the political red tape inherent when governments of nations must agree on fine points of the working machinery of a program international in scope.

Basic strength of Western Europe is its huge industrial capacity—still greater, according to official sources than that of Russia and its satellites. Its weakness lies in inadequate army, navy and air forces. Politically, Western Europe generally suffers from weak morale.

► **Tactical Air Requirement**—To speed rearmament of Western Europe in keeping with North Atlantic Treaty Organization agreements, the Western Group will concern itself mainly with air transport and special emphasis on tactical aviation. This is in addition to other factors of military defense.

• **North American F-86 Sabre** will be standardized for production in Western Europe as this nation's contribution to tactical air defense of NATO nations. Tests are now under way at Edwards AFB, Muroc, Calif., of a Canadian Avro Orenda-powered version of the F-86. On the basis of the improved performance of the plane with the 6500-lb. thrust Orenda the Canadian engine will probably be used to power F-86s scheduled for export under MDAP. Canadair Ltd., now licensed to build the F-86F in Canada, currently uses the General Electric J-47.

• **Republic F-84** also figures heavily in USAF MDAP commitments. The Thunderjet is also under consideration for manufacture in France and in Italy, although no decision has been reached as yet.

► **Industrial Rehabilitation** — Revised fiscal year 1950 estimates of financial defense potential for treaty nations was set at $18,326,000. But these funds were virtually frozen to expenditure on basic commodities only and provided no real assistance to the building of industry.

Legislation provided for in the overall fiscal 1951 budget boosted these funds $475 million. Most important to North Atlantic Treaty nations in new legislation was the fact that this money could be spent in actual industrial rehabilitation.

Of the $475 million total, Defense Department estimates approximately $110 million is allocated for rebuilding and expanding treaty nations' aircraft industry. Production potential as a result of that expenditure is estimated at approximately $607-million worth of tactical aircraft and engine production of approximately $64 million.

Support to give impetus to industrial.

Estimates being programmed at the Department of Defense also provide for meeting deficiencies in all activities relating to air power. Major emphasis is to be given industries developing radio, radar and wire communications, ammunition, bombs, rockets, machine guns. Parallel procurement is planned for motor transport and special purpose vehicles for aircraft refueling and operations.

► **Transports**—Secondary consideration of nations allied in the North Atlantic Treaty Organization is the build-up of the air transport industry. Cargo planes under scrutiny of defense planners for foreign manufacture are the Douglas-licensed Canadair DC-4M and the Fairchild C-119.

Fairchild Engine & Airplane Corp. officials have already been approached by British and Canadian representatives in connection with the possibility of licensing the C-119 for manufacture both in Canada and in England (Aviation Week Sept. 18). Despite the fact that the company is reported to have turned down offers of both nations, military sources insist that the plane is scheduled for foreign production.

Military reports over the impending foreign licensing of the C-119 are borne out by the fact that France, Italy and England are scheduled for quantities of the C-119. Secondly, Fairchild is working out design problems of a heavier four-engined version of the Packet which indicates that USAF is nearing programmed phase out of the present twin-engine configuration.

More than 50 Fairchild Packets were ordered in fiscal 1950. Additional orders for nearly 200 were placed by USA out of fiscal 1951 regular and supplemental funds. Of this number slightly over 30 were purchased for Navy. By July, 1951, well over 200 Packets will be in operational status for USAF.

Decision to license the Canadian Douglas DC-4M for manufacture both in England and in Italy, military sources state, stems from two MDAP decisions

• **To standardize on equipment** of the Allied nations

• **To utilize end products** of all those nations toward building a United Nations air force

► **Immediate MDAP Transfers**—To meet the more stringent material needs of nations of the North Atlantic Treaty, USAF and Navy are transferring some of their World War II aircraft. Both services have ample quantities of piston engine fighters and light bombers in storage throughout the U. S. and in Europe.

Republic F-84 jet fighters now in use by USAF both in England and in Germany are scheduled for transfer to England and France late next spring. Their transfer will be effected as soon as production of other fighter types in the U. S. is sufficient for replacements to be sent over.

► **British Reliance**—Reason for British reliance on U. S. production fighters stems from the upset of its national economy during World War II. Great Britain has been forced to a continuing program of research and development in military air requirements rather than to settling on production of "in-being" air weapons.

Examples of this situation are the Hawker P. 1081 and the Vickers Supermarine 535, both of which have an enviable performance record. Despite the present international tension, neither has been placed in production. Reports from England indicate that production is not planned.

British policy, whether forced by economy or by some other dictate, has one serious drawback, U. S. military sources state.

In event of a sudden "emergency," the British Commonwealth might not be able to get into production soon enough to defend itself.

► **French Requirements**—French air officials have told Aviation Week that what is most urgently needed by the French government is technical assistance. Of course, we too, these officials state, have immediate requirements for aircraft in quantity if we are to hold up our portion of the Western alliance.

But what is needed most are technical teams to give know-how to the French, and then assistance toward rehabilitating their aircraft industry—plane and engine wise.

Decision by the NATO nations of whether to rearm Germany will have a tremendous impact upon the speed up of North Atlantic Treaty Organization's entire rearmament program.

• **Republic F-84** also figures heavily in USAF MDAP commitments. The Thunderjet is also under consideration for manufacture in France and in Italy, although no decision has been reached as yet.

HAND-LOADING of mail is too costly and slow if airlines want to do a big mail business

Mail Means Money, PO says

Airlines can take bigger share of $300 million a year business with special planes, claims new official.

The $300 million-a-year business of transporting domestic mail—99 percent of which now moves by surface carrier—has developed into a new traffic frontier for air carriers.

New Assistant Postmaster General, John Redding, in an interview with Aviation Week puts the challenge. It's up to the air carriers themselves. The gap is closing between the cost of shipping by surface and air. If the carriers have the enterprise to close the gap still further—by bringing highly economic planes for mail carriage into service and improving handling techniques—mail could become big-time business for the airlines."

► **No Panty Yet**—The cost difference is still great. Post Office payments to surface carriers for domestic mail transport—first, second, third, and fourth class—now averages 8.33 cents a ton mile (from Association of American Railroads). This compares with 50-to-60-cents a ton mile to the Big Four airlines for airmail, including parcel post. Payment to all air carriers averages $1.32 a ton-mile (from Air Transport Assn.).

But two factors, now in the offing, could radically alter the situation.

• **Rail cost boost.** Railroads, which carry all but a small fraction of domestic mail, are seeking a 95 percent pay increase in the four categories. This would bring the average payment to the rails for mail shipments from 8.33 cents to over 16 cents a ton mile.

• **"Mail" plane.** Post Office is surveying designs for a plane specifically suited to mail service, but believes air carriers should take the initiative. One aeronautical firm has designed an all-mail plane which it estimates could transport mail over long hauls with a high load factor for 10 to 12 cents a ton-mile. It would carry four truckloads, compared with the Fairchild Packplane's capacity of one truckload and would be equipped with the labor saving and cost-cutting hydraulic lift detachable chassis of the packplane.

(Slick Airways, all-freight line, has offered to haul mail for the Post Office for 15 cents a ton-mile.)

The prospect is that the rails will be granted in the neighborhood of a 40-percent increase in mail pay, rather than the 95 percent they are seeking. This would raise surface mail pay to an average 11.66 cents a ton-mile. This would then be the new cost level air lines would have to meet—or at least approach—to make a substantial inroad into the mass mail market.

"They are never going to get it the way they are going now," Redding commented. "The air carriers have concentrated on passenger traffic and ignored cutting costs to us. With some minor improvements, they are still loading mail as they were in 1928. They are still following the costly method of manually handling one sack at a time."

▶**Big Market**—There is over 3070 million ton-miles of domestic mail business a year. The airlines now move only about 27 million ton-miles of this. A shift to the airlines would have two national defense benefits. It would build up civil airlift and release cars, now in acute shortage, for defense business.

When, and if, airlines move into the mass second-, third-, and fourth class mail business, income won't keep pace with the volume increase. In the 1949 fiscal year, for example:

Surface carriers moved 3030 million ton-miles and received $253 million for doing it. The airmail volume of 40 million ton miles was only a drop in the bucket compared to this, but air carriers were paid $54 million.

The outlook is dim for shifting short-haul business from surface to air. Volume would not justify large economical planes, frequent stops would add to the cost, and there would be little, if any, time saving.

But Redding is optimistic over mass transfer of long haul business from surface to air. One type operation, for example, which appears feasible: transcontinental all-mail runs with stops at three or four major cities. Mail would be fanned out from the city airports to smaller points by whatever transport method would be most economic—air, truck, rail. Ability of the operation to compete with transcontinental surface service hinges on development of a highly economic mail plane.

Redding's primary mission at the department is to improve service by cutting operating costs—for surface as well as air. For the past several years, the department plodded along with costly, outmoded methods of operation and sought to offset its mounting annual deficit with postage increases.

▶**Post Office Survey**—"But that is putting the cart before the horse," Redding observed. With the approval of the President, he has launched a survey to determine how and where Post Office costs can be cut—through mechanization of handling, utilitarian "factory" type post offices instead of "palaces with foyers," channeling mail into the most economic mode of transport.

Field studies are now under way, under the immediate direction of the 15 regional general superintendents of the Postal Transportation Service. The program to cut operating costs will be continuous, but Redding hopes to have proposals for some cost-cutting changes in a few months.

If he succeeds, future demands for increases in airmail and other postage rates—bound to come if Post Office's deficit keeps mounting—may be averted.

NEW SUPER CUB GETS OFF FAST

New Piper Super Cub for 1951, powered by 125 hp. Lycoming, shows agility during demonstrations at Flushing Airport, N. Y. With a light load the plane can get off the ground in about 75 or 80 ft. With two people aboard it has easily cleared a 20 ft barrier 150 ft. from start of takeoff. Rate of climb is over 1000 fpm at 1500 lb. gross weight. It can be flown at 33 mph. with flaps down. Another version has the 90 hp. Continental engine. All models are finished with nonflammable Duraclad butyrate plastic. The 125 hp. Super Cub sells for $3695 and the 90-hp. plane for $3295.

Excess Profits

Airlines' circumstances call for special tax treatment, ATA says.

The airlines must get very special consideration if Congress decides to levy an excess profits tax. Air Transport Assn. President Robert Ramspeck told the House Ways and Means Committee recently.

In putting forth proposals for the Committee, Ramspeck is firing a shot gun at long range. Each shot carries a special proposal. That is because it is too early to know just what will be the final target, after Congress has worked on the excess profits problem.

ATA isn't asking for complete exemption from excess profits legislation although it believes it can make a fair case for total exemption—with the point that airlines are in a way a part of the Armed Forces that they need all their belated profits to build up their capacity and that they are an armed reserve organization.

The alternative to asking outright simple exemption from EPT is to suggest several ways that any EPT law may give the airlines some breaks.

Chief arguments for the airlines are:

• **No profits at all** were made by most airlines during the base period 1946-49 proposed by Secretary of the Treasury John Snyder. So all profits would be excess profits if the levy were based on the average 1946-49 as normal.

• **High debt ratio** of many airlines would penalize them under the administration-proposed invested capital base for figuring "normal return." Average airline's debt is 38 percent of its invested capital, including earned surplus. With some lines like Capital Airlines, debt is more than 50 percent. The administration would allow only a return of 5 to 8 percent on invested capital—after disallowing part of the debt portion of that invested capital.

Secretary Snyder's most favorable definite proposal is the invested capital formula for EPT. Mr. Ramspeck shows that the record airline earnings of this year 1950 would come to only a 3 per cent profit on investment under the Snyder proposal. The 3-percent formula would cut an estimated $45 million operating profit to $15 million.

• **Airlines' growth penalized** under any formula suggested by Snyder based on a "normal" profit, as opposed to an "excess" one.

• **Defense preparation** inherent in air line profits and subsidies plowed back into new planes would be curbed by the excess profits tax formulas.

CAB, charged with responsibility for building airlines, figures they need profits of roughly 7-10 percent for normal equipment and traffic development.

▶**Recommendations**—The following are some of the special angles Ramspeck suggests Congress should write into the Excess Profits Law to allow reasonable airline income and growth:

• **Exempt mail pay.** The airlines urge that mail pay be excluded from the income subject to the EPT. Problem here is that an unknown part of mail pay is plain revenue for carrying the mail. The natural thing would be to exempt subsidy from government tax. But no one has ever been able to figure how much of mail pay is subsidy and how much for mail carriage. So the airlines say exempt all mail pay.

• **Rate of return on invested** capital should be figured on 100 percent of all capital invested, including debt. Rate of normal return should be no less than that allowed by the CAB when it establishes mail rates.

• **Allow normal growth.** The airlines like the television makers are in a period of rapid natural growth. When Secretary Snyder made his tax proposal to the Ways and Means Committee, he did suggest there should be a formula to give special treatment to companies just getting started during the base period. But he offered no details. He left that up to the "growth companies" themselves.

▶**Change the formula**—The suggested formulas for figuring normal airline earnings are these:

• **Change the base** to 1946-50 instead of 1946-49.

• **Pick the best year** of earnings in the 1946-50 period as base instead of the whole period.

• **A moving base period** would be even better. This would allow for "actual physical expansion" occuring between the end of the base period and the taxable year. This would recognize a normal return per unit of capacity.

• **Physical growth formula.** The ideal allowance for company growth would be figured on actual increase in physical carrying capacity of the airlines. While a statute laid down by Congress could not earmark the exact units of planes, says Ramspeck, it could set the general principles for the Treasury Department in figuring specific regulations.

ASME Hears Cargo Solutions

Our future air cargo problems should all be little ones if we would only get into being a fleet of:

• **Boeing Stratofreighters,** says Alan F. Kelsey, of Boeing Airplane Co.;

• **Douglas DC-6As,** says J. R. McGowen, Douglas Aircraft Co., Inc.;

• **Douglas C-124-A Globemasters,** says S. S. Kreisler, also of Douglas;

• **Some of everything,** says Lt. Col. L. S. Rochte, chief of AMC's Air Cargo Branch.

These statements were made, in expanded forms showing only minor variations, at the Air Cargo Day sessions of the annual meeting of the American Society of Mechanical Engineers (Nov. 26—Dec. 1, 1950).

LAKE LA GUARDIA

Scene at La Guardia Field during the destructive storm which hit the eastern seaboard on Nov. 25 shows a TWA Constellation, a Northeast Convair-Liner and three NEA DC-3s riding out the gale which had some portions of the field under about 13 ft. of water. The field was out of operation from 11 AM Saturday until 6 AM Sunday. The promontory stretching across the picture is normally the combination loading gates structure and public observation platform.

The air cargo meeting was co-sponsored by the Institute of Aeronautical Sciences and the Society of Automotive Engineers.

▶**Stratofreighter** — Boeing's Kelsey voiced a plea for resolving the basic differences between military and CAA requirements for air cargo craft in order to make a commercial cargo fleet instantly available in the event of national emergency. He used as an example the Air Force requirement for power-section fire extinguisher systems in the engine nacelle, which CAA does not require.

Kelsey also claimed that ten Stratofreighters, used exclusively for the purpose, could have evacuated all the Americans wounded during the first few months of the Korean war from Tokyo to the United States by air.

▶**Douglas DC-6**—An airlift of a different type was used by McGowen, of Douglas. He stated that 200 new DC-6A transports could airlift all the cargo carried during peak World War II operations of both Air Transport Command and Naval Air Transport Service.

After showing that the Douglas DC-4 (or C-54) is the standard commercial four-engined cargo craft, McGowen went on to demonstrate just how much better the new DC-6A is as a cargo carrier.

▶**Globemaster III** — Douglas' second contribution to the air cargo fleet was envisioned as a division-mover in fleets of 80. Kreisler claimed that an entire division of 16,000 armed men could be moved from Westover Air Force Base, Mass., to the vicinity of Brest, France, with two refueling stops en route.

Another 80 Globemasters would be needed to move 2500 tons of divisional equipment over the same route.

▶**Static Display**—As an adjunct to the presentations, there was a static display of a number of airplane models, cargo handling equipment and procedures provided by the manufacturers, airlines and terminal authorities.

Liaison Planes Competition Starts

Air Force liaison plane competition gets under way at Wright-Patterson AFB, Ohio, this week with 21 aircraft companies competing for a production order of 300 planes (AVIATION WEEK Nov. 13).

Competition requirements include the following: must be four place and include provision for field conversation to transport of two litter patients, attendant and pilot, or equivalent light cargo, instrumentation for night and limited weather operation, 250 mi. flying radius, 5 hour minimum endurance; cruising speed minimum of 110 mph., service ceiling minimum, 15,000 ft.

Washington Roundup

Defense "Economy"—Again?

There's a new move to cut back on defense. It's man-spring State Department.

Backstage, State fought former Defense Secretary Louis Johnson's "false economy" program—which set Air Force back from the 58-group program voted by Congress to a 48 group program and slashed naval aviation. The $13 billion ceiling Johnson program trimming the country's defense strength weakened U S prestige abroad—and State's voice in world affairs.

But the $40-$50 billion budget for U S Armed Services that military leaders now have in sight has State worried. It would probably mean trimming the economic and military spending abroad that is the backbone of State's foreign policy.

Advance by Retreat?

State Department officials, backstage, are now citing a new version of the Johnson thesis that defense strength can be increased by decreasing expenditures. Johnson claimed it could be accomplished by "coordination", eliminating administrative personnel. State officials are now proposing that cutbacks in "unnecessary" supporting operational personnel for fighting units will accomplish the two conflicting desirables: a spending decrease and a defense increase.

• **Air Force**—which has had a manpower board working for over two years to make "ruthless" slashes in administrative and supporting personnel—is particularly irritated and sensitive to hints that it's over-staffed with deadwood.

• **USAF 80 Groups**—The "transitional" 69 group USAF program was passed on hurriedly by the Joint Chiefs of Staff after the Korean outbreak as a "stepping stone"—until a program could be worked out to assure adequate air strength to defend the U S and meet its fighting obligations that might develop at points around the world.

After conferences with the JCS, congressional military leaders are convinced that this is the "bare minimum" and "must" program for USAF.

• **Strategic Air Arm**—35 groups, including six heavy bomber groups, to retaliate on an aggressor. Finletter Commission recommended only two heavy bomber groups for offensive action.

• **Air Defense**—22 1/3 groups, or 67 squadrons. This force is necessary to keep up a 24-hour alert for attack from any approach.

• **Tactical Air**—One group for each army division. This would be 20 groups—if Army is built up to the 1 5-million man or 20-division strength military leaders consider necessary. In addition, USAF should have three tactical reconnaissance groups: an east-based, west-based, and "seed corn" group—for training replacements for groups that might move to fronts.

It adds up to an 80.3-group USAF.

The groups would be militarily stronger than the groups contemplated in the Finletter Commission's 70 group program of 1948—and they are functionally reorganized for more effective offensive and defensive action and ground support. The Finletter Commission, for example, didn't gear tactical aviation to Army division.

Price Rises—Or Miscalculation?

BuAer reports that reductions from mass aircraft procurement are offsetting price increases. But USAF says prices are skyrocketing and has requested an additional procurement appropriation to offset the rises—which will come between $500 million and $1 billion.

BuAer officers think USAF miscalculated, on the low side, in its original estimates. USAF officers think BuAer originally miscalculated on the high side.

Fight or Fizzle?

Write off the big advance billings given the tactical aviation hearings which Chairman Carl Vinson announced his armed services committee will hold. The key question now is whether there will be any hearings at all. Vinson is non-committal on this. He called the public sessions after USAF tactical support in Korea "didn't turn out to be all that it was supposed to be". But, since then, USAF and Army have cooperated to improve ground-air maneuvers. This was the purpose of the hearings.

If they do come off now, the hearings will amount to a cordial situation report by the services—not the inter-service row matching the B-36 conflagration" anticipated in some quarters.

Triple-Deck Airports

Airport operators now look on "vertical" expansion instead of "horizontal" expansion as the only way to solve the increasingly serious problem of terminal ramp congestion. Philadelphia's master airport plan makes the first step in the vertical expansion direction with a double deck airport: planes and freight would be handled on the airport ground level, passengers would exit from the plane on a ramp parallel from the plane door to a second story of the airport. Under the triple-deck plan, airport operators are now considering, mail and freight would be handled on a subway floor, leaving additional space for planes on the airport ground floor, and passengers would take off from a ramp to a second floor.

Here and There

• **Fixed base operators.** A sizable portion object that USAF's plan to rehabilitate bases—possibly three—to train pilots under civil contract is "extravagantly wasteful." There are plenty of commercial bases ready to train pilots, they say.

• **Air academy.** USAF will make a new drive for it at the beginning of the year. Over a hundred Congressmen are tangling to have it located in their home state.

• **Francis Deak,** new chief of the State Department's aviation division, has no doubts Pan Am will eventually be permitted into Paris and Rome. "But the case is moving slowly." He was formerly air attache at Berne, handling air affairs for the entire eastern European area.

• **Newly-elected Sen. Everett Dirksen** will be active on civil aviation. He served on the special Air Safety Committee, headed by the late Rep. Jack Nichols and was a leader in the fight for a standing aviation committee in the House, during his service there.

PRODUCTION

AF Contracts

Cappel McDonald awards for over $3 million lead negotiated list.

U S Air Force negotiated 54 contracts of $25,000 or more in the period Nov. 13-17 for a total of $11,922,646, the Air Materiel Command reports.

Leading the list for the week was Cappel McDonald & Co., Dayton, with two contracts totaling $3,184,918 for long range sustenance kits. Only other contract in excess of $1 million was with Sundstrand Machine Tool Co., Rockford, Ill., $1,119,710 for alternator drives. Douglas Aircraft Co. received four contracts, totaling $1,160,981 for aircraft spare parts.

List of negotiated contracts of $25,000 or more for period Nov. 13-17 follows. Previous contracts (AVIATION WEEK Nov. 27) were for the period Nov. 6-10, rather than for Oct. 30-Nov. 3 as reported earlier by the Air Force.

Negotiated Contracts

A. B. Dick Co., Chicago, duplicating machines, $101,049.

Adel div., General Metals Corp., Burbank, Calif., valve assemblies and spare parts, Cl. 03J, $45,702.

Addressograph-Multigraph Corp., Cleveland, printing presses and attachments, $161,367.

Addressograph-Multigraph Corp., Dayton, duplicating machinery, $250,675.

Air Products Inc., Cleveland, oxygen regulators, Cl. 03K, $25,314.

American Gas Accumulator Co., Elizabeth, N. J., rubber covered transformers, Cl. 08D, $365,172.

John Bean div., Food Machinery & Chemical Corp., Lansing, Mich., assorted tool sets, Cl. 17A, $167,901.

Blackhawk Mfg. Co., Milwaukee, ram & pump assemblies, Cl. 17B, $44,200.

Brown, Stewart R. Mfg. Co., Inc., New York, lamp assemblies, Cl. 08A, $144,336.

Cappel McDonald & Co., Dayton, long range sustenance kits, Cl. 13, $942,018; long range sustenance kits, Cl. 13, $2,242,900.

Cardell Mfg. Co., Dayton, propeller stand assembly, Cl. 17C & 19C, $50,638.

Ditto, Inc., Chicago, duplicating machines, $69,028; duplicating machinery, $30,334.

Doebbe Metal Furniture Co., Inc., New York, office furniture, Cl. 40A, $908,478.

Douglas Aircraft Co., Inc., Santa Monica, Calif., aircraft spare parts, Cl. 01D, $45,057; aircraft spare parts, Cl. 01D, $45,894; aircraft spare parts and tools, Cl. 01D, $270,000; aircraft spare parts, Cl. 01D, $800,000.

Dumont, Allen B., Laboratories, Inc., Clifton, N. J., cathode ray oscillographs, Cl. 17, $47,328.

East Coast Aeronautics, Inc., Mount Vernon, N. Y., arctic shelters and data, Cl. 19A, $378,995.

Eastern Rotorcraft Corp., Willow Grove, Pa., tie down devices, Cl. 03T, $332,500.

Eastman Kodak Co., Rochester, N. Y., photographic film, Cl. 10C, $135,657.

Electric Storage Battery Co., Cleveland, aircraft storage batteries, Cl. 03J, $446,720.

Fairchild Camera & Instrument Corp., Jamaica, N. Y., scot maintenance parts, Cl. 05E, $63,425.

Fiberous Glass Insulation Co., Inc., Wilkes Barre, Pa., aerial delivery chute assemblies, Cl. 20, $124,089.

General Electric Co., Schenectady, N. Y., turbosupercharger regulator spare parts, Cl. 03E, $140,420.

General Electric Co., West Lynn, Mass., engine spare parts, Cl. 05E, $44,995.

General Tire & Rubber Co., Akron, clamp assemblies, runway markers, Cl. 08D, $49,606.

General Tire & Rubber Co., Akron, wheel and brake assemblies, Cl. 03B, $36,776.

Harrisburg Steel Corp., Harrisburg, Pa., cylinder assemblies, Cl. 06B, $214,026.

Hartman Electrical Mfg. Co., Mansfield, O., cut outs and relays, Cl. 03C, $80,869.

E. Horton & Son Co., Windsor Locks, Conn., piston position indicator, Cl. 17C, $52,575.

Jamestown Metal Corporation, Jamestown, N. Y., weather sequence panels, Cl. 40, $27,100.

Lawson, div., Hart Carter Co., New Holstein, Wis., D-1 heater maintenance part, Cl. 19C, $40,592.

Liquidator Corp., Long Island City, N. Y., fuel and oil indicators, Cl. 05G, $75,618.

M-B Mfg. Co., Inc., New Haven, Conn., engine mounts, Cl. 03J, $257,400.

McConnaughey Stationers Inc., Springfield, O., weather station furniture & equipment, Cl. 40, $93,890.

McLeod Company, Cincinnati, sand blast cabinets, Cl. 17A, $92,435.

Minneapolis-Honeywell Regulator Co., Minneapolis, automatic pilot components, Cl. 05F, $33,882.

Murdock Webbing Co., Pawtucket, R. I., nylon webbing, Cl. 21, $39,750.

Norma-Hoffman Bearing Corp., Stamford, Conn., ball bearings, Cl. 04D, $25,568.

North American Aviation, Inc., Los Angeles, aircraft assemblies & sub-assemblies, Cl. 01M, $82,195; aircraft assemblies & sub-assemblies, Cl. 01M, $30,954.

Riverside Metal Co., Riverside, N. J., phosphor bronze metal round, Cl. 23A, $83,365.

Romec div., Lear Inc., Elyria, Ohio, air compressors, Cl. 16A, $42,954.

Schwien Engineering Co., Los Angeles, vertical gyro indicators, Cl. 05C, $117,900.

Scintilla Magneto div., Bendix Aviation, Sidney, N. Y., exciter units and spare parts, Cl. 03C, $82,332.

Servomechanisms, Inc., Mineola, N. Y., rouge servos, Cl. 11B, $86,000.

Sperry Gyroscope Co., Great Neck, L. I., automatic pilot parts and tools, Cl. 05F, $372,580.

Sundstrand Machine Tool Co., Rockford, Ill., alternator drives, Cl. 03I, $1,119,710.

Taylor-Wharton Iron & Steel Co., Dayton, cylinder assemblies, Cl. 06B, $140,421.

Timken Roller Bearing Co., Canton, O., roller bearings, Cl. 04D, $29,295.

Vickers, Inc., Detroit, pump assemblies, Cl. 03I, $283,611.

NAA Expands Production Plans

North American Aviation, Inc. is busy expanding and shifting around its production facilities to insure smoother operations.

Following on the heels of the company's acquisition of the Columbus, O., Curtiss-Wright plant (AVIATION WEEK Nov. 13), comes word of a new $1-million-dollar building program.

▶ **More Space**—Additional manufacturing and warehousing space totaling 238,000 sq. ft. under cover will be constructed immediately south of the present warehouse, across the highway from NAA's Los Angeles plant at International Airport.

The added facilities will centralize the material division offices and release more floor space for F-86 work at Los Angeles.

First NAA will add 75,600 sq. ft. to the existing warehouse and put in a 33,600-sq. ft. mezzanine to take care of the material division offices. An additional 8000 sq. ft. will be added to the warehouse shed to provide storage for the increased stocks.

One of two new manufacturing buildings will total 108,000 sq. ft. It will be used for fabrication, housing extrusion forming and sheet stretch-form operations, plus such processing as heat treat and degreasing. The other building of 12,800 sq. ft. capacity will take care of drop hammer and power hammer work. Machinery in the new buildings will be moved from present locations and the space thus opened turned over for assembly work.

▶ **Production Shuffle**—To step up production NAA is rearranging some of its operations. The T-28 trainer project will be moved from Los Angeles to Downey with T-6C output moving from Downey to Long Beach. Work on the B-45 Tornado will continue at Long Beach but the control surfaces department will shift to the Torrance plant where F-86 wing assembly is being undertaken.

NAA's aerophysics laboratory at Downey is also being enlarged. Here the company is working on missiles, sub-miniaturization of electronic parts and research on a practical nuclear

power reactor Dr Sidney Siegel, formerly manager of Westinghouse Electric Corp s atomic power division, is working at Downey as associate technical director of the Atomic Energy Research department, assisting Dr Chauncey Starr, technical director of nuclear reactor studies

Hughes Ups Wages

A five percent pay boost plus four cents added to base hourly rate has been agreed to by Hughes Aircraft Co Culver City Calif The increase amounts to from ten cents to 15 cents an hour Salaried employees are getting a 7 5 percent increase The boosts add $2 million to the company's annual payroll

The deal was worked out between the company and Aircraft Industry Workers Local 1553, affiliated with the United Brotherhood of Carpenters and Joiners of America, the International Brotherhood of Electrical Workers, AFL, and the United Aircraft Welders of America

Lockheed Calls for Subcontractors

Subcontractors are sharing increasingly in Lockheed Aircraft Corp.'s production of Air Force and Navy planes

Cessna has been signed up to fabricate the empennage of the F 94 all-weather jet interceptors and T-33 jet trainers Contracts for the Constellation and for Navy's P2V Neptune anti-sub patrol plane will also be announced soon, according to Lockheed

The company prefers to subcontract major units, rather than a large number of small units and pieces. Lockheed's vice president and general manager Courtlandt S Cross, outlined this policy

"As far as possible we have selected major integral units that are simplest in design least likely to be affected by engineering changes and having the highest unit volume The plan leaves Lockheed with the more complicated center fuselage sections and cockpit flight stations on which we feel our experienced and skilled workmen can do the best job"

Lockheed's employment is expected to rise from its present level of 17 000 to a peak of about 19 000 in the next 18 months Three work shifts will probably be required in many subassembly and fabrication departments

AF Invitations

Bid openings are 20 30 days after approximate issue dates shown in the following bid proposals Bid sets containing specifications for items to be procured will be sent to qualified applicants who state bid invitation number

One bid set will be available for examination without obligation by prospective bidders after bid publication date at each of the seven AMC procurement field offices This will enable firms to see specifications before writing or telegraphing for their own bid sets

Procurement field office locations Boston Army Base Boston 10 Mass Government Aircraft Plant No 4 Ft Worth 1 Tex 39 S LaSalle St Chicago 3 Wright Patterson AFB Dayton Ohio West Warren and Longo Aves Detroit 32 155 W Washington Blvd Los Angeles 67 Broad St, N Y 4

INVITATIONS

Socket assembly, 900 each bid invitation No 51-988 issue date 8 Nov delivery complete within 90 days

Clothing, 1-25 items bid invitation No. 51-989 issue date 3 Nov delivery beginning within 60 days complete within 210 days

Connector-plug, 1-5 items bid invitation No 51 990 issue date 3 Nov delivery 50% within 45 days balance within 75 days

Gloves 1 6 items bid invitation No 51-992 issue date 3 Nov delivery beginning within 45 days and complete within 60 days thereafter

Connections 1-10 items bid invitation No 51 993 issue date 3 Nov delivery 50% within 30 days, 50% within 60 days after date of award

Electric tachometer, 1 99 items bid invitation No. 51-1025 issue date 6 Nov delivery starting within 30 days complete within 150 days

Heater 1 5 items bid invitation No 51-1033 issue date 9 Nov delivery starting within 30 days and complete within 75 days after date of award

Hose assembly 200 each bid invitation No 51-1034 issue date 9 Nov, delivery within 60 days.

Aircraft hardware 1-9 items bid invitation No 51 1035 issue date 9 Nov delivery starting in 45 days complete in 120 days after date of award

Gaskets and packing, 1-23 items bid invitation No 51-1036 issue date 9 Nov delivery starting in 45 days, complete in 90 days

Connectors 1-13 items bid invitation No. 51-1037 issue date 9 Nov delivery within 60 days after date of award

Container assemblies 1-4 items bid invitation No 1 1078 issue date 6 Nov deliveey items 1 & 2 within 45 days item 3 within 60 days item 4 within 45 days after date of award

Bar assemblies 1-3 items bid invitation No 51 1035 issue date 9 Nov delivaey within 30 days after date of award

Nuts 1-15 items bid invitation No 51-1040 issue date 9 Nov delivery starting within 45 days and complete within 90 days

Air screw cones 1-4 items bid invitation No 51-1041 issue date 8 Nov delivery beginning within 90 days after date of award.

Lathes 1 12 items bid invitation No 51-1042 issue date 9 Nov delivees starting within 115 days and complete within 240 days

Aircraft cable 1-9 items bid invitation No 51-1043 issue date 9 Nov delivery within 70 days after date of award

Connectors 1 5 items bid invitation No 51-1044 issue date 9 Nov delivery within 60 days after date of award

Connectors-plugs 1-4 items bid invitation No 51-1045 issue date 9 Nov delivery within 30 days after date of award

Clothing 1-9 items bid invitation No. 51-1046 issue date 9 Nov delivery starting within 30 days and complete within 90 days

Connectors, 1 0 items bid invitation No 51-1047 issue date 9 Nov delivery within 90 days.

Tank-hydecoolie 378 each bid invitation No. 51 1056 issue date 10 Nov, delivery complete within 210 days

Tester assembly 62 each bid invitation No 51 1057 issue date 10 Nov delivery complete within 200 days after date of approval of first article

Steel spring annealed steip, 1-9 items bid invitation No 51-1062 issue date 10 Nov delivery within 90 days aftee date of award

RF cable assembly, 400 each bid invitation No 51-1063 issue date 10 Nov delivery within 90 days after date of award

Capacitor, 1-10 items bid invitation No 51-1064, issue date 10 Nov, delivery complete within 60 days after date of award

Brass, 1-37 items bid invitation No 51-1069 issue date 10 Nov delivery complete within 90 days aftee date of award

Connector-plug, 1-6 items bid invitation No 51-1071, issue date 10 Nov delivery within 30 days after date of award

Communications equipment, Class 10, 1-7 items bid invitation No 51-1072, issue date 10 Nov delivery within 60 days

Rubber-latex, 1-58 items bid invitation No. 51-1020 issue date 16 Nov delivery 50% in 30 days, 50% in 90 days

Belt, 1-100 items bid invitation No 51 1076 issue date 10 Nov delivery to start in 45 days complete in 120 days

Aircraft hardware C-1 1 96 items bid invitation No 51-1075 issue date 10 Nov delivery to start in 90 days complete in 120 days.

PRODUCTION BRIEFING

▶**Lockheed Aircraft Service International** has taken a two-year lease on a one-story warehouse covering 13,000 sq ft at 87 94 130 St, Richmond Hill, Queens, N Y The company is also handling electronic modifications on two Douglas B 26s operated by Sperry Gyroscope Co. Boeing has given LASI a contract to modify approximately 30 Stratocruiser nose landing gears on planes operated by PAA and BOAC LASI is converting a Douglas C-54A to a C-54E for Seaboard & Western Airlines

▶**Aircraft Maintenance International, Inc**, has signed a contract with Douglas Aircraft to refurbish two DC 6s used by Italian Airlines (LAI) which the carrier operated while awaiting delivery of new DC-6s

▶**Southwest Airmotive**, Dallas, has announced an additional 54 000 sq ft of floor space at Love Field bringing the firm's total space to 170 000 sq ft The addition has been subleased from Braniff for five years

▶**Century Engineers**, Burbank, have received a contract from Lockheed Aircraft to do complete design of wingtip auxiliary fuel nacelles for the P2V Neptune

▶**Peterson-Fender Engineering Co**, Ft Worth Tex, has added a 16 000 sq ft plant to existing facilities to expedite increasing aircraft subcontract orders

▶**Timmerman Products Inc**, plans to begin construction soon on a new research laboratory adjacent to the office section of its recently opened $2 million Cleveland plant The new lab will cost about $200 000

New High-Thrust Turbojet Seen for GE

Company's gas turbine engineers confident of leading British soon.

By Irving Stone

Lynn, Mass.—General Electric Co. is intensifying its activities in the aircraft gas turbine field, and a wide expansion may be expected soon.

Now, only 4 percent of GE's total labor force is engaged on its turbojet and aircraft instrument projects. But this figure will soon soar.

At GE's 287,000-sq. ft., Everett, Mass. plant, the company manufactures all components (except gear case and turbine wheel) for its turbojets assembled at the 375,000 sq. ft. Lynn works.

Also at Lynn are the company's new gas turbine laboratory (for full scale and scale-model testing of compressors and combustion systems) and its aircraft instrument division.

► **Lynn Plus Lockland**—Another GE turbojet assembly plant is at Lockland, Ohio. This facility and the Lynn plant have been turning out jets at about the same rate for the past year.

But Lockland will soon see an expanded program. GE's engine design and drafting activities will be shifted to Lockland from Lynn in a move which should be complete by next June. This shift will include management personnel, too.

And in addition to engine assembly from subcontracted parts, Lockland will fabricate some engine components.

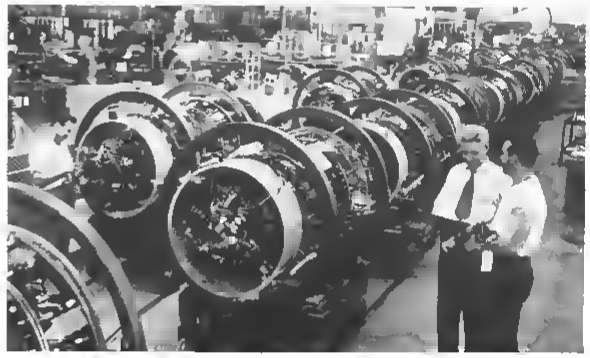
At Lynn, the usual turbojet assembly program will continue from parts fabricated at Everett.

► **New J-47s**—The company's present production program is concentrated on its J-47 jet projects. GE has just announced two new versions of this engine.

• The J-47-GE-17 has an afterburner, high-altitude starting system, anti-icing provisions and an electronic control system. An additional, and highly important, feature of the -17 is that its strategic material content has been greatly reduced in comparison with the basic J-47s now powering AF planes.

A hint that GE was actively exploring the field of material substitution to reduce strategic metals in jets was revealed in AVIATION WEEK, May 8, which analyzed an SAE paper by Jerard M. Pedersen of GE's Aircraft Gas Turbine division.

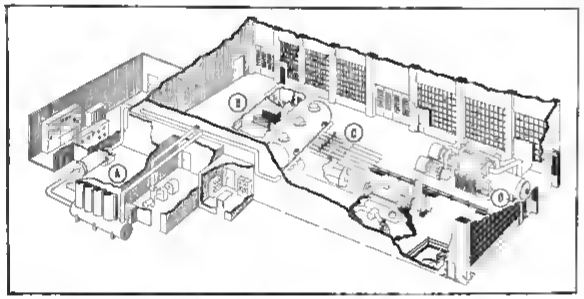
J-47-GE-17 has afterburner, deicing, electronic controls, and fewer strategic materials



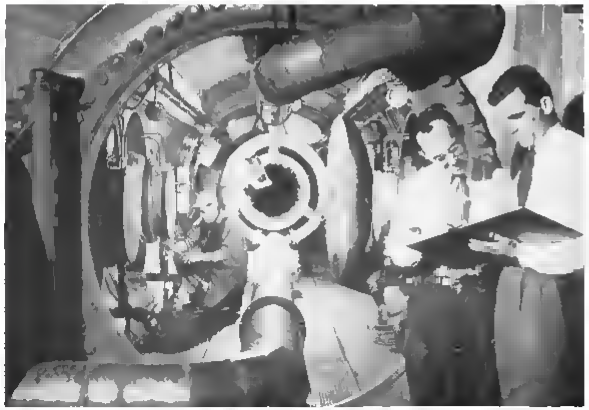
FINAL ASSEMBLY station just before routing jets to test cells for "green" run

SHIPPING CAN firmly cradles J-47. Unit is non-sinkable, filled with dehydrated air

"BRAIN BOXES" on -17 jet control maximum permissible limits of temperature, fuel flow and acceleration that can be handled without damage to engine or aircraft structure



NEW LAB for jet components. A, combustion test stand, B, main control room, C, full-scale compressor stand, D, scale-model stand. Facility will simulate 70,000-ft. height.



TEST CHAMBER for experimental compressor (blacked out, in rear center). Steel chamber has 10-ft. diameter, is about 40 ft. long. Facility has run about 300 hr. to date.

• The J-47 GE-23 is an unaugmented engine, also incorporating the anti-icing features and high-altitude starting system.

Thrust ratings for the -17 and the -23 have been announced as "in excess of 5200 lb." While GE officials will not confirm a specific higher thrust figure, it is believed that the thrust value of the -17 with afterburner should be 7500-8000 lb., for the unaugmented -23, 6300-6500 lb.

▶ **Slant on Sapphire**—Considering the pace of jet engine development in the U. S. and England, it is obvious that the company hasn't frozen its efforts by limiting progress to just improvement of the J-47.

And the power recently announced for the British Armstrong-Siddeley Sapphire (7200 lb. thrust) doesn't seem to cause any concern among GE technicians, even though their company's "in excess of 5200 lb." thrust statement admits, by implication, of a substantial gap between J-47 power and that of the British jet.

GE has been approached on the proposition of manufacturing British engines, it is reported, but nothing has come of it. GE technicians say there is no need for the company to build under license a higher power British jet engine because they feel they have better stuff coming up.

They also feel that their new turbine testing lab gives an advantage that marks the turning point in forging ahead of the British, who, they say, have to get their data mainly through flight tests, since they have no such extensive ground-test facilities.

▶ **New One?**—These opinions, coupled with the apparent lesser thrust value of the J-47, can only give rise to the inference that GE is developing another engine, which from the dimmest view will have a thrust at least equal to, or from a favorable view will be considerably higher than the Sapphire's.

While company officials will not confirm the existence of a specific project, the designation "J-53" generally has been attributed to a new GE jet development.

▶ **How Much Thrust?**—What will be this engine's power potential?

It is logical that the company won't come out with a new design that will just about match the Sapphire's performance, for that would be, in a sense, only "catching up."

It is more likely that the company has set its sights high and will come out with a jet developing power far in excess of anything flying today.

The new engine's power potential probably will exceed 12,000 lb. thrust—with a target value perhaps as high as 15,000 lb.

▶ **47's New Features**—Data on the company's "all-weather" -17 and -23

engines were revealed during a two-day press tour of the Lynn and Everett facilities

The J-47-GE-17 is slated to power North American's F-86D This afterburner fitted powerplant will incorporate

- More efficient compressor having greater air flow
- High-altitude (50,000 ft.) starting system similar to that already on the 19 pod jets used on the B 36

The scheme provides for two sparkplugs instead of one per chamber, thus doubling the ignition energy for the two cans that are fired

And the cross fire tubes to the other six cans have been increased in size (over those on the -11 production engine) so that they now have about three times the cross sectional area Also there are changes in the fuel system to give better control

- **An anti-icing system** to permit operation under severe weather conditions Hot air from the eighth stage of the engine's compressor is bled to feed hollow nose installations—inlet guide vanes, fairings and support struts—temperature being sufficiently high to melt icing accretions

Because this air, in the production J-47, has been used to balance the forward thrust on the rotor (to avoid use of a large thrust bearing) no further thrust loss was involved in harnessing it for anti icing

- **An air inlet screen** to exclude debris during ground operation, which is retracted soon after takeoff so that it cannot act as a framework for an ice dam or cut down on the air flow into the compressor Plans are under consideration to key the extension and retraction of the screen with that of the landing gear
- **New integrated electronic fuel and** jet nozzle control system This consists of a single lever for engine control, sensors for translating temperature, speed and related data into electrical readings, and two kidney-shaped electronic computers—brain boxes—located in the aircraft forward of the powerplant to avoid complication of the engine installation

▶ **How Control Works**—The computers compare power needs as indicated by the throttle, against the engine's performance, and correct any deviations between the two conditions by changing the fuel valve settings to control engine speeds or adjusting the variable-area tailpipe nozzle to control exhaust velocity or temperature

This is done by amplifiers stepping up the small currents to power levels to actuate electric motors

The brain boxes control the maximum permissible limits of temperature, fuel flows and acceleration which the engine can handle without damaging itself or the aircraft structure. And the pilot can do nothing to make the computers exceed these limits

The new thermocouple sensing unit is designed for high response and long life

▶ **Benefits**—Here are the advantages claimed for the electronic control

- **Influence of the human element** and consequent errors are minimized
- **At takeoff**, the pilot just sets his throttle, eliminating the need for nursing it or keeping a close check on temperature gages, because the electronic system has taken over.
- **Engine life** will be increased because excessive temperatures or fuel flows are prevented
- **Maximum performance** is maintained, the sensors picking up slight changes in temperature, altitude, etc., and fuel flow being adjusted to cope with the new conditions
- **Control** of the basic engine and afterburner is integrated, with fuel and nozzle adjustments made that could not be done by the pilot with high efficiency
- **A factor of safety** is provided, so that if any part of the control system is damaged, as from shell fire, the power setting at time of failure is maintained until an emergency hydraulic control system is cut in to take over.

▶ **Old vs. New**—GE engineers stress the efficiency of the electronic system by comparing it with the attention required for a current afterburner-equipped jet with combination hydraulic and manual control, where pilot starts the basic engine, closely checks instruments and throttles back if temperature goes high enough to threaten turbine wheel damage And to prevent engine stall, the afterburner cannot be cut in until the basic engine is up to speed

With the new system, pilot presses the starter and immediately can push the throttle to full power with afterburner, the controls bringing the engine up to speed and cutting in the afterburner automatically

▶ **Strategic Materials Cut**—Incorporation of less critical materials in the -17 has followed intensive testing and evaluation At present, the strategic metal content of the engine has been reduced about one-third and GE officials feel that a two-thirds reduction can be attained

While no sacrifice in engine life or performance is anticipated as a result of the materials substitution, no conclusive data will be available until the engine has finished many hundreds of operational hours

With the J-47-GE-23, emphasis was placed on getting started on production of the anti-iced engine And though the -23 does not now have strategic material reductions comparable to the

-17, substitutions are scheduled as production proceeds.

▶**Titanium Tried**—GE has not overlooked the advantages of using titanium, a metal whose potential looms large on the aircraft horizon.

The company is already released to use titanium for sheet metal brackets and clips, but has not found the material to be sufficiently available. And high cost is still a hurdle.

But it has evaluated titanium experimentally in compressor blades and wheels and its engineers say that the metal has stood up exceptionally well.

▶**Lab Details**—The new 30,000 sq. ft. aircraft gas turbine laboratory—dedicated to the late Dr. Sanford A. Moss, creator of the turbosupercharger—went into operation about the first of this year.

The facility was designed to test components, rather than complete engines, because it was felt that more fundamental design information could be obtained and in much less time.

Compressor research is being pushed because this component is believed to be the key factor in achieving higher powers.

GE engineers say that the lab is intended to test components having large airflows at higher pressure ratios and over higher temperature ranges than previously possible in this country.

The lab facilities were set up to satisfy these conditions:

- **All test variables** such as temperature, pressure and speed should be measureable with a precision to give a probable error in overall performance data not exceeding ± 1 percent.
- **Use of the lab for testing at high power levels should not significantly diminish the equipment's utility when used with small or intermediate component sizes.**
- **Avoidance of long delay** from mechanical failure of test parts.

▶**Requirements**—Power is supplied by a 35,000-hp steam turbine plant which can drive compressors capable of pushing out air flows of 320 lb per sec. The plant consumes 255 000 lb of superheated steam per hour.

More than 14 million cu. ft. of air per hour can be brought to -70 F. by a cooling cycle using water from the Saugus River and four sets of refrigeration compressors and turbines. In full operation, the lab needs 4.8 million gal. of water per hour.

▶**Compressor Stand**—To date, this facility has chalked up more than 300 hr. of running time. It is a 10-ft.-diam. steel tank about 40 ft. long, insulated on the compressor inlet side with eight layers of aluminum sheeting. The discharge section is insulated externally with glass wool.

The stand operates either open or closed cycle, but thus far it has been used on the former scheme because data were desired in a hurry and the closed cycle was more difficult to set up quickly. The closed cycle will soon be put into operation.

Altitudes of 70,000 ft. will be simulated, temperatures attained down to −100 F.

More than 700 readings of temperature, air flow, pressure, torque, blade strain, vibration and blade clearance are made during a compressor test.

For clearance measurements, a GE-designed device—Clearancometer—employing a small contact "flag" is used to indicate the space between the compressor case and rotor blade tips before, during and after tests.

▶**Control Room**—Coordination is through a test foreman, 18 test operators and data recorders and ten equipment men. Main floor and basement operators are directed through intercom.

Half-hour readings of temperatures and pressures are fed to a central recording station so that there is no delay in interpreting data and to avoid the necessity for re-runs days later when the particular equipment may be inoperative.

Warning signals guard against maintaining over- or under-limit pressures and temperatures.

▶**Combustion Setup**—This test facility accommodates complete combustion assemblies operating over a pressure range from sea level to 250 psi. The installation can burn fuel at rate of 50,000 lb. per hour.

Combustion (and compressor) exhaust is cooled by water spray to below 400 F. before it is ducted to externally located silencers.

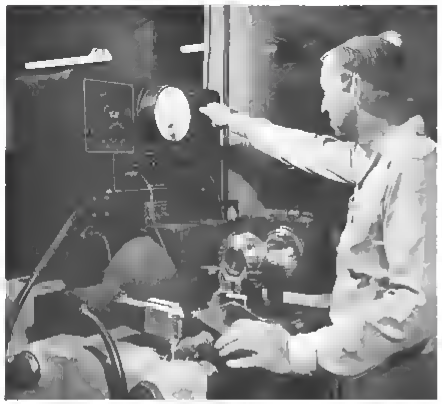
▶**Instrument Highlights**—GE's Aircraft Instrument division is housed in a new 100,000 sq. ft. plant which became fully operational about two months ago. It provides hot, cold, and humidity rooms for checking instruments under various climatic conditions encompassing a temperature range from −60 to 180 C.

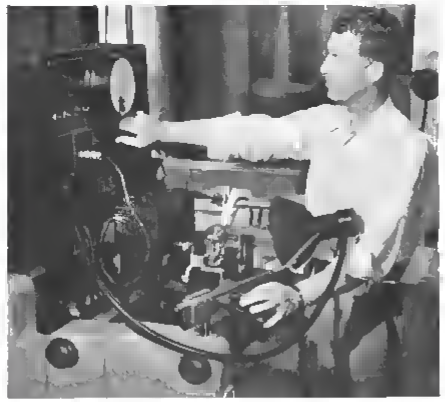
The division is constantly working to improve designs and bring out new designs to cope with the fast rate of aircraft instrument obsolescence.

Another problem is to design for growing reduction in cockpit panel size, hence the trend is toward smaller and smaller indicators. For example, pointers for new-type indicators are but ¾ in. long and 1/40 in. in diameter.

Despite the small size of the new instruments, production is conducted on a mass basis.

And supplementing the trend to smaller instruments is the increased emphasis being placed on automatic control devices to minimize pilot attention.





DYNAMIC BALANCING of air bearing gyro components is carried out in the dust free rooms of North American's precision machine shop

Air Bearing Gyro for Missile Guidance

Pickle-barrel accuracy envisioned through air film lubrication that reduces friction to nearly zero.

Some mighty fine airplanes have been produced by North American Aviation, Inc.—but as yet they haven't produced a perpetual motion machine. They have done the next best thing, though, with one of their latest devices, an air bearing gyro.

Give such a gyro a little spin with your fingers, and walk away. If you come back after several hours, the rotor will still be spinning. And if you go away and come back two hours later, it will still be spinning—turning on air, the closest thing to a frictionless bearing.

Right now, these gyros form the stable heart of a missile guidance and control system under development by North American.

▶**Accuracy Necessary**—Any missile control system is an automatic navigational aid—an autopilot, if you will—which has to be extremely accurate. The system must be able to spot the missile's position with respect to a set of reference axes.

The center of the earth is a convenient origin for a set of axes which define the aircraft's position in space. To detect the earth's center, a true vertical must be established. A "plumb bob" has to be dropped from the missile.

The navigational plumb bob is a stable vertical line in space defined by a gyroscope. The vertical is located only as accurately as gyro errors permit.

And the thing that introduces error into the gyro—and that hasn't been eliminated, and never can be—is friction.

▶**Air is Best**—But friction can be reduced greatly. Ball bearings are superior to Babbitted ones, fluid suspension is an improvement, an air bearing is, right now, the best.

In an air bearing, the rotating object is carried on a thin layer of air—say one or two thousandths thick—which acts as the lubricant between the rotor and its bearing.

Thus, the only friction resulting in such a bearing is the viscous friction inherent in the air itself, and that is pretty small.

Starting friction of such a bearing is, to all intents and purposes, zero.

Sounds easy? Well, it's not. Manufacturing an air bearing gyro means drilling holes a few thousandths of an inch in diameter; of balancing a rotor dynamically to a few milligrams, of machining a shaft to a tolerance of a few millionths of an inch.

That's very fussy machine work—and it's expensive. But in exchange, you get a missile guidance system which really means pickle-barrel accuracy when the range is measured in miles instead of yards.

$650,000 for B-36 Environment Testing

The Fort Worth division of Consolidated Vultee is expanding its engineering test laboratory for aircraft equipment from the present 17,000 sq. ft. to approximately 45,000 sq. ft. of floor space at a cost of $650,000. The purpose is to set up a complete center equipped with the best scientific apparatus for "environmental testing" of aircraft.

B-36 components and equipment will be subjected to atmospheric and other physical conditions which the huge strategic bomber is likely to encounter anywhere around the world.

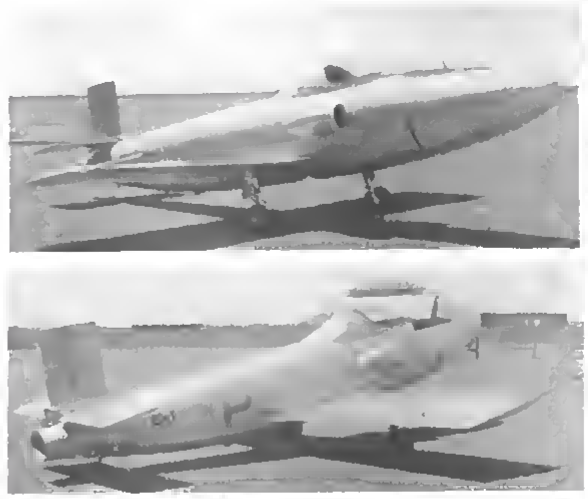
▶**Higher Altitudes**—A new and larger altitude chamber is required—one in which altitudes can be simulated up to 80,000 ft. and temperatures brought down to —100 deg F. Present Convair laboratory provides "altitudes" to 60,000 ft. and temperatures down to —75 deg.

However, B-36s flying at altitudes of some 45,000 ft. have recorded temperatures as low as 100 deg. below zero.

Some equipment, functioning well at —65 deg., may not work at still lower temperatures. Electrical and electronic equipment requires careful construction and protection to insure troublefree operation under widely fluctoating flight conditions.

▶**Weather Machine**—Materials such as fabric and rubber will be tested by a "weather machine" that provides conditions simulating deterioration from sun and moisture. Mildew and fungus attrition can be duplicated.

Other apparatus planned will create swirling dust storms, salt spray and other natural phenomena.



Australia's First Homegrown Jet

The first Australian designed jet aircraft, a missile prototype, made its initial flight Oct 31 at the Woomera Rocket Range in South Australia

Plane was built at the Government Aircraft Factory at Fishermen's Bend, Victoria, to specifications prepared by the British Ministry of Supply and Australian engineers

▶ **Prototype for Pilotless**—Two pilot-carrying prototypes are the forerunners of a number of high-speed pilotless aircraft Eventual plans for the series call for complete ground control of takeoff, maneuvering and landing

Until such time as the complex control gear has been completely developed, the first two aircraft will be flown by human pilots

Power unit is a single Armstrong-Siddeley Adder, a 1000 lb thrust baby turbojet developed from the Mamba

▶ **Again, No Details**—No size or performance figures have been forthcoming, but a glance at the photos shows that it must be small—the overly large cockpit blister and the tiny landing gear give that away

Wing and tail surfaces are of constant chord and thickness Leading edges appear quite sharp and the thickness chord ratio is low, hinting at high subsonic speed capabilities

Overall assessment of the design is that it is a small, remarkably clean and simple jet aircraft, that it should fly at high subsonic speeds, that it should be inexpensive and easy to produce Australia's first home-grown jet aircraft is a perky little beauty, and perhaps can well wear that self satisfied look so evident in the top photograph

Titanium Carbide Bonding Tested

Important gains in higher power output of aircraft gas turbines depend greatly upon increased combustion temperatures Increased temperatures, in turn, can be accommodated only as turbine metals and compositions with greater heat resistance are developed

Titanium is a promising newcomer here, as elsewhere in metallurgy A recent NACA investigation at the Lewis Flight Propulsion Laboratory, Cleveland, tested the bonding characteristics of titanium carbide with 15 elements, fused individually on solid, high-density titanium carbide

In a helium atmosphere and at atmospheric pressure, only chromium, cobalt, nickel and silicon produced satisfactory bonds—with nickel showing the best penetration

The elements that did not bond under the conditions of the experiment were aluminum, beryllium, columbium, gold, iron, lead, magnesium, manganese, platinum, titanium and vanadium

Full details on the apparatus used and the procedure followed appear in NACA Tech. Note 2187, authored by Walter J Engel

Fuel Fills Floats

An increase of 400 gal. in the fuel capacity of the Grumman SA-16, together with other minor modifications, has served to increase the range of the Albatross from its present 1900 to approximately 2550 nautical miles.

The Air Rescue Service—major user of the AF's SA-16 (Navy UF-1)—says the amphibian "is now considered qualified to fulfill the search and rescue missions."

▶**Wet Floats**—The production Albatross (AVIATION WEEK July 17) has 675-gal. main tanks located in the wing center section. Mountings are provided underneath the center section for a 100, 150 or 300 gal. drop tank. "Wet Floats" are the new modification permitting the latest range increase. Each wing float has been redesigned to accommodate 200 gal. of fuel.

An additional modification involved removing the radar dome from the left wing and placing it inside the hull—simultaneously solving a balance problem and eliminating excessive stress upon the left wing float during waterborne operations.

▶**Triphibian**—The next change scheduled for this versatile aircraft is the attachment of skis, which will make the SA-16 triphibious. The main supporting ski will consist of a metal strip, 12 in. wide, 15 ft. long mounted permanently along the bottom of the hull. The aft 7 ft. portion is hinged and has oleo struts at the rear to cushion the plane during takeoffs and landings. Each of the wing floats has an extended ski.

Jet Noise Studied

The distinct thundering roar of a powerful jet engine may be reassuring to the designer—but up close it can be a pain in the ear. And it can cause nausea, dizziness and possibly temporary mental instability, to say nothing of mechanical damage to the ear.

▶**Research Underway**—Programs concerned with the effects of sound of various intensities and frequencies are now underway here and abroad. One such program, at the Aero Medical Laboratory at Wright-Patterson AFB, Dayton, Ohio, is concerned with the study of permanent damage to the inner ear.

Experiments are conducted with guinea pigs because aural damage equivalent to that in humans can be obtained at lower levels of sound intensity.

The animals are anesthetized and exposed to damaging sound produced by a siren. Sound frequencies between 250 and 150,000 cps can be developed, at variable and controllable intensity, by this siren. For reference, the normal ear of a young adult responds to sound frequencies between 20 to 20,000 cps.

Ground Test for Omni Equipment

By Scott H. Reiniger

A newcomer in the growing staff of mechanical servants that keep complex aircraft groomed for flight is a tester for airborne omnirange equipment.

This device, intended for check out of the equipment before takeoff, is becoming a "must" item for both military and civil operators, now in the process of gradually shifting from low-frequency radio to very high frequency omni navigation instruments.

Even now, the Civil Aeronautics Administration is busy closing the last gaps in the nationwide omnirange network which makes possible the use of these visual aids in the cockpit.

▶**Omni Tester Role**—Here's where the omni tester fits in. From the standpoint of time, cost and effectiveness, the only practical method of checking flight functions of airborne omni is on the ground. With a properly designed test set, this can be done as thoroughly and accurately on the ground as in flight—and in a shorter time.

For a comprehensive check in the air, the pilot would have to waste time and fuel flying a complete circle around the ground omnirange station to find out if his set was correctly calibrated through its full scope of 360 deg. A perfunctory check on several tracks in one sector of the omni circle might indicate the set was functioning properly, when actually it was out of calibration in another portion of the circle.

Even pre-flight checking on the ground by fixing on a nearby omni station would give only a single track check and that probably would be wrong. Buildings, trees, uneven terrain would give erroneous indications.

▶**How It Works**—With the need for ground omni testers apparent, let's see how one operates. A set that can be used both for quick pre-flight checkouts and for general maintenance and overhaul of airborne omni is the H-14 signal generator. This tester was developed recently by Aircraft Radio Corp., Boonton, N. J.

Among airlines that have purchased this unit are American, Eastern and Capital. The Air Force and Navy also reportedly have shown interest.

This relatively high powered, accurate set can be located in the hangar or at some other central point near a 115v a.c., 60c power outlet for flight line checkout or bench work. With a microphone connected to it, the set permits voice instructions from the person operating it to be transmitted simultaneously with test signals to the pilot or co-worker in the cockpit. In this way, a limited "go no go" preflight check of omni equipment in aircraft can be made in less than a minute for a single plane or a squadron of planes at the same time, ARC says.

The set will produce signals strong enough to be heard in the immediate vicinity of the airport. These can be adjusted to a lower level for single plane checks.

This is what the tester does:

- **Checks for alignment** of airborne omni on 24 tracks, at 15 deg. intervals.
- **Checks for proper operation** of 90/150 cps runway (tone) localizer receiver, indicated by "left-center-right" movement of cross-pointer needle. Also tests for visual-aural range sensitivity and flag-alarm operation.
- **Provides means for checking** omni course sensitivity.
- **Tests for proper operation** of "To-From" meter and omni flag alarm.
- **Gives cross-pointer** "left-center-right" check of phase localizer. Also checks phase localizer sensitivity and flag alarm.

For bench maintenance and overhaul work, the H-14 provides signals of accurately known frequency, amplitude and modulation for quantitive tests of VHF navigational equipment, ARC says.

▶**Switch in Roles**—While the pilot would have to fly around the omni station to check equipment in flight, with the ground tester, the situation is reversed. The plane stays still while the tester, in effect, goes around, sending out different track signals as it does so. These are precise, "built-in" signals, mechanically fixed at each notch on the tester's 24-track selector dial.

The omni course signals are laid down by a synchronously-driven tone wheel equipped with accurately located pick-up coils. The simulated signals are not subject to phase error, once the basic "zero phase" has been established, ARC says. The amplitudes of the "variable" and "reference" modulations are independently adjusted to the standard value, then applied to the r.f. output tube simultaneously. A modulation meter and an r.f. level meter are provided for continuous and simultaneous monitoring.

The omni tone wheel also provides "reference" and "variable" modula-

tions required to produce "left-center-right" readings for checking or calibrating the phase-localizer receiver

A second tone wheel, driven by the same synchronous motor which operates the omni tone wheel, provides the 90/150 cps signals for checking or calibrating the amplitude localizer receiver and visual aural range.

▶ **Full Range**—The set operates on two crystal controlled frequencies which may be located anywhere in the localizer and omni bands, from 108 to 118 mc Crystals are mounted in sockets on the face of the unit, facilitating removal and replacement Unless otherwise specified, two crystals providing frequencies of 110 9mc for localizer and 114 9mc for omni are supplied

The radio frequency output terminates in two BNC receptacles At one, a fixed output of one volt is available for connection to a 52-ohm antenna load When not in use, the receptacle is capped with a 52-ohm termination At the second receptacle, a variable output from 1 to 10,000 microvolts is provided This output is adjusted by means of a calibrated attenuator on the control panel The source impedance of both output connections is 52 ohms Shielding of stray fields is such that measurement can be made without appreciable error on receivers having a sensitivity of one microvolt, ARC says

Audio modulation derived from the r f output is available at the "Demod" receptacle on the face of the tester This output is provided for testing audio converter circuits independent of the r f for maintenance work Two binding posts (Ext Mod) are provided for modulating the r f from an external source For example, a keyed signal might be applied for identification purposes External modulation at this point is effective in all positions of the main function switch except when the operator is actually talking over a microphone hooked into the set

▶ **Built-in Ruggedness**—The H 14 operates on 115v– a c 60c current, draws 160 watts A built-in electronic voltage regulator maintains d c levels to the required constancy for supply voltages from 103 to 128v

The tester is designed to meet moisture shock and vibration requirements of current military specifications for such equipment and operate through ambient temperatures from —40 to 50 C

ARC lists these accuracies for the unit Frequency, ± 005 percent from —40 to 50 C omni track angle, ±½ degree at room temperature, ±1 degree from —40 to 50 C , r f output, ±2 db modulation, ±2 percent

The H 14 measures 10¾ x 17⅜ x 12¼ in and weighs 39 lb Priced at $885 f o b , the tester comes equipped with necessary power supply and r f. cables

A Continental CV 240 on which the airline is solving augmentor tube failure problems

CAL: Progressive Midwest Carrier

Continental Air Lines overhauls engines, tests latest types of equipment at Stapleton Field.

By George L. Christian

Denver—Overhauling higher-powered aircraft engines can be a tricky business, with plenty of headaches. But Continental Air Lines feels it is successfully blending the ingredients of skill, careful planning and precise testing to handle the problem at its maintenance base here.

This is no idle boast. A. P. Shelly, CAL's director of maintenance and engineering, says Continental had fewer unscheduled removals in 1949 of its R-2800 Pratt & Whitney engines (used on Convair 240s) than any other U. S. airline. On a world-wide basis, the only operator whose unscheduled removal rate bettered Continental's for 1949 was KLM Royal Dutch Airlines, according to Shelly, who said his source was P&W's service statistics.

Here are other equipment and maintenance notes gathered at the airline's main overhaul base at Stapleton Field, Denver.

Continental's CV 240s have been experiencing trouble with the forward cabin windows, according to Shelly. The windows are damaged by rocks, gravel and other matter picked up by the low-clearance propellers and flung against the foreward portions of the fuselage.

The airline is investigating the desirability of replacing the forward four or five windows with Sierracin panels whose hardness, it feels, will better resist the impact of propeller-thrown objects.

Wayne Lydon, instrument overhaul foreman, expressed satisfaction with the performance of the Bendix Scintilla ignition analyzer which Continental has had in service since April. All of the airline's Convairs (total of 5) are wired to receive the instrument which is used primarily on the ground.

At each No. 1, 2, and 3 check, the analyzer has aided greatly in detecting incipient ignition malfunctions. It is also used whenever an ignition "squawk" shows up on the log book and on the engine run-in stand where overhauled engines are checked.

The airline's engineers pointed out these advantages realized with the analyzer:

- **Incipient ignition failures** (improper magneto or distributor timing, fouled spark plugs) could be detected and corrected before the malfunction manifested itself on any of the cockpit instruments.

This feature increased on-time performance and, primarily, was of a great safety value. Continental is especially conscious of engine performance because of the many marginal, high-altitude fields it operates through.

- **Time saving** in analyzing ignition trouble is considerable. The guess work in trouble shooting is practically eliminated since the instrument enables mechanics to localize the source of trouble rapidly and accurately.
- **Money saving**, not only because troubles are found more quickly, but also because less replacement material is required. If plugs foul up, the analyzer "puts the finger" on the bad actors and thus one, two or three plugs are changed instead of a complete set of 36.

Continental said that total cost per plane for installing the necessary parts and wiring was $250 plus labor. Time required is 90 manhours per ship.

The airline has not yet been able to determine accurately the actual savings in time and money attributable to the use of the Scintilla unit but it is sure they are considerable.

Continental engineers proudly point to the fact that they are the first U. S. scheduled airline to use the Sperry Zero Reader (Aviation Week June 12). KLM Royal Dutch Airlines already has the instrument installed in its Constellations.

The airline reports that its pilots are enthusiastic about the Reader and that it is considering making it standard equipment on its fleet of Convairs. The one Reader now on service test has operated satisfactorily for 100 hr. The airline anticipated an initial overhaul period of 1000 hr. with 1500 hr. a good possibility. Total installation cost was $184.37 and 90 manhours.

Shelly told Aviation Week that dynamically balancing the Convair tire and wheel assembly, a newly instituted procedure, has resulted in a considerable reduction in vibration during the take-off roll. This is especially true of the nose gear. Continental balances the wheels at speeds up to an equivalent of 140 mph.

Shelly continued that his airline believes it has found the solution to the augmentor tube failures which have plagued Convair operators for so long. Tubes made of Roslyn Metal are the answer, he thinks. A laminated material made up of two thicknesses of stainless steel sandwiching a layer of copper in between, the material has given excellent results on the one aircraft on which it is being service tested.

Shelly anticipates the Roslyn Metal augmentor tubes will give a service life of 5000-6000 hr.

Continental is currently evaluating the BG RB27R fine wire platinum spark plug (Aviation Week Sept. 4) with Champion's R37S-1 mass electrode plug in its R-2800 P&W engines equipped with the Bendix-Scintilla low tension ignition system.

Both types are now being removed at 300 hr., and fouling rather than erosion tends to be the factor limiting plug life. The airline says it has not accumulated enough time on either make of plug to decide which one to use.

Continental is replacing all its Eclipse Pioneer tachometers with Kollsman dual units embodying built-in synchroscopes.

On the basis of a test installation engineers noticed a considerable reduction in tachometer oscillation and in

overhaul cost An added feature was the inflight reduction of off synchronized propeller beat

The Kollsman unit derives its power from the existing tachometer generator

Continental expressed complete satisfaction with the new type single disc Goodyear brakes recently installed on its Convairs The airline said that the braking action was excellent and that overhaul and maintenance on the units was routine

CAL expressed dissatisfaction with the seats originally supplied in the Convairs Maintenance was high and comfort low So it is currently converting all CV 240 seats to airfoam cushions The airline admitted that this was an expensive conversion, but felt that the considerable reduction in maintenance made the expenditure justifiable It was equally sure that its passengers would welcome the increased comfort afforded by the foam rubber

Shelly pointed out that, although Continental is small as U S airlines go, it is keeping pace with the latest technological advances in the airline equipment field The results of this continuing effort to stay abreast, he feels, can result only in a safer, more efficient operation

British Report on Airborne Radar

Airborne radar will result in safer, more punctual flight

British Overseas Airways Corp already is installing such equipment, manufactured by E K Cole, Ltd (AVIATION WEEK, Aug 14) in Hermes aircraft The airline's technical department, in conjunction with E K Cole, cite the following reasons for improved flying conditions resulting from airborne radar

Fuzzy" indications on the radar scope, indicating moderate rain, can be distinguished from the smaller, more sharply defined echoes characteristic of cumulo nimbus clouds by a "reasonably experienced observer" The latter type of cloud is the only one which produces hail.

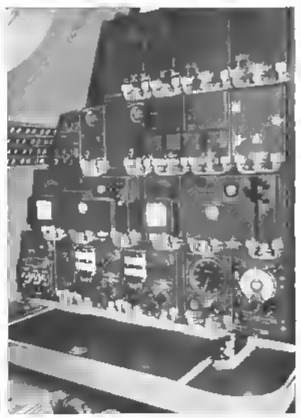
Use of the radar will reduce diversions because fronts which appear impenetrable to the naked eye usually have navigable gaps when explored by airborne radar

▶**Key to Design**—Design of future equipment can be predicated on the operational data obtained with current equipment, especially when further experience is gained with a variety of aircraft in varying conditions of turbulence

Ability of the radar to detect and give ample warning of ground obstructions is of undeniable importance

Passenger comfort is greatly increased because of the pilot being able to detect and circumvent turbulent areas As speeds of aircraft increase, and commercial jets enter the transport field this attribute will also have safety implications

The normal British flying practice is for one pilot to study the screen while the other flies the aircraft Thus the pilot's eyes do not continuously have to readjust themselves from outside to interior illumination



BOAC Shows "Comet" Radio Gear

(*McGraw-Hill World News*)

These newly released pictures show British Overseas Airways Corp's de Havilland "Comet" cockpit radio installation

Left photo shows, above the pilots' heads, the two control units for the Marconi 7092A automatic direction finder

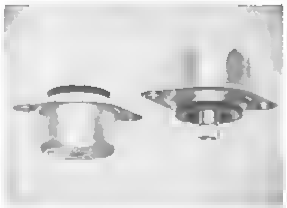
Relative bearing indicators are on instrument panel, one in front of each pilot

Right photo illustrates arrangement of radio and navigational aid equipment aboard the aircraft The sets are identified as follows

- **Top row** two intercom units, two power units for the Marconi AD107 high power transmitters
- **Second row** aircraft switchboard, two voltage regulators, two Marconi AD-7092A automatic direction finders and spare boxes
- **Third row** dual Marconi AD107 drive and amplifier installation
- **Bottom row** Intercom station box, direction finder switch box, two Marconi AD94 communications receivers, Marconi AD7092A indicator and radio loop controller, Marconi AD7092A control unit

Provision has also been made for omni range equipment, high- and low-range radio altimeters, Loran and airborne radar (AVIATION WEEK, Aug 14 and above)

NEW AVIATION PRODUCTS

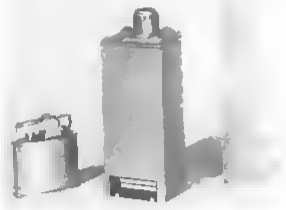


Airborne Mounts

Inverted, air damped shock mounts are being produced by Barry Corp for use with lightweight airborne equipment that must be installed where space is restricted

These units, Series 6475 Barrymounts, have load ratings ranging from 0 3 to 3 0 lb provide effective vibration isolation with advantages of air damping, yet raise supported equipment only ¼ in from mounting surface

Mounts measure one inch in diameter, have an overall height of one inch under minimum rated load Center stud is tapped to a depth of ¾ in with an 8-32 thread The firm says racks utilizing these new mountings can be furnished to government specifications Address 179 F Sidney St, Cambridge 39, Mass



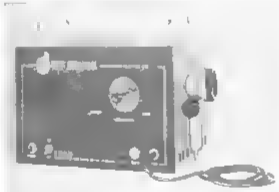
Shakes Jet Gages

While the Barry mount, described above is designed to take out vibration, here's a unit that, because of different circumstances, is designed to put it back in

The device pictured here is an instrument panel vibrator—an outgrowth of the jet age Where piston engine flight has created problems of too much vibration, jet engine flight has created a problem of too little vibration

Altimeters, airspeed indicators and other gear operated instruments in smooth flying jet planes register erratically or lag if not subjected to a certain amount of vibration to overcome gear friction in the instruments Hence the instrument panel vibrator ft shakes them up as needed

This unit was developed by Safe Flight Instrument Corp, White Plains, N Y A small electric motor in the device turns an eccentric weight 2000 to 3000 rpm The vibrator is hermetically sealed, operates on 27v d c current with a maximum drain of 04 amps Equipped with radio filters, the unit weighs only 11 oz, measures 4½ x 1½ x 1¼ in Safe Flight says the panel shaker is being produced in quantity for the Boeing B-47 Stratojet



Small Field VHF

A new low cost, two way VHF voice communications package tailored to meet the needs of small airports not now equipped with tower facilities has been developed by Lear, Inc

Called the Unicom "Portable VHF Control Tower", the equipment includes a crystal controlled, single-channel VHF transmitter VHF tunable receiver, speaker, microphone, a c power supply, antenna and 60 ft antenna cable Transceiver, power supply and speaker are combined in a single, portable unit weighing only 24 lb Carrying handles facilitate moving the unit from one location to another

Setting the unit up merely involves assembling a simple antenna and plugging the receiver transmitter to a 110v 60c power source Lear says anyone licensed to operate a transmitter in an airplane is qualified to operate the Unicom on the ground

Controls consist of an on-off power switch, receiver tuning knob, receiver volume control and a transmit-receive button on the microphone Flipping on the power switch energizes both receiver and transmitter

The transmitter is rated at a full 2 watt output, operates on a nominal frequency of 122 8mc, and requires no adjusting Receiver is tunable over the 108 127mc frequency range and has a special calibration button which permits the operator to calibrate it aurally at the 122 8mc frequency It is stable to 01mc, incorporates automatic volume control and noise limiter The antenna, for both sending and reception, is a vertical radiator type with a four-rod horizontal ground plane The Unicom sells for $495 f o b, 110 Fonia Ave, NW, Grand Rapids 2, Mich

Air Cargo Loader

"Mobiloader" air cargo-handling conveyor belts developed by Sage Equipment Co, have been ordered in quantity by American Airlines, according to the maker

The first unit in an order totaling $160,000 reportedly has been placed in operation at Buffalo Airport The equipment, consisting of a 21-ft conveyor belt mounted on a specially built Chrysler truck is expected by AA operations personnel to speed freight and luggage handling by 50 percent, Sage says

The belt is mechanically controlled, has a rough, rubberized surface and is supported in a frame that can be quickly raised or lowered and eased forward or backward when the truck maneuvers into position Address 30 Essex St, Buffalo, N Y

ALSO ON THE MARKET

Permanent, non-laundering headrests made of Venlon plastic, produced by Firestone Plastics Co, will not absorb dirt or moisture, simply require wiping with detergent after each trip to keep clean and sanitary, says the firm These non-rumpling headrests are fabricated by Howard Zmk Corp, Passaic, N J

"Allspeed Drive" variable speed transmissions with tandem belts come in six models with ratings ranging from 1 to 15 hp Each model offers six drive variations from 16 1 to 6 1, can be supplied with built-in motor Made by Worthington Pump and Machinery Corp, Holyoke, Mass

Portable electric arc welder, Model 125A, has 16 heat stages from 20 to 125 amps, handles 1/16 to 5/32 welding rod Compact unit has sloping control panel for easy operation, simplified terminal control Made by Trindl Products, Ltd., 17 E 23 St, Chicago 16, Ill

Keyless drill chucks from Europe are available in ¼, 25/64, 33/64 and ½-in sizes Self-centering chucks, made by Leo Hjort Co, Denmark, are built to close tolerances Available from Hanser Machine Tool Corp, 30 Park Ave, Manhasset, N Y

FINANCIAL

CAB Asks Interchange Agreement

Request that EAL enter through-service pacts is strongest Board support yet of such arrangements.

The principle of equipment interchange received strong impetus through the unprecedented action of the Civil Aeronautics Board in requesting Eastern Air Lines to enter into agreements with two other carriers to provide through air service between Miami and several midwestern cities.

This is the first time the Board has taken the initiative in proposing a through-service involving equipment interchange among two carriers. In the past, CAB merely passed judgment on such proposed arrangements as conceived by the carriers themselves.

In this instance, the Board proposes to link Miami with Kansas City, Omaha and Denver in a one plane service operated by a combination of airlines. CAB has requested Eastern to arrange with Mid-Continent Airlines for a no-change service between Miami, Omaha and Kansas City via St. Louis where the two lines meet. CAB has also asked Eastern to arrange with Braniff Airways for through service between Miami and Denver via Memphis a common terminal for both companies.

The Board has declared that it has authority to compel the airlines to enter into such agreements but would not use this power at present. Instead it would "keep the record open" for 60 days to permit the airlines to work out the arrangements "voluntarily" among themselves.

▶ **Compromise Measure**—In this Board action, the equipment interchange device may emerge as a compromise measure in broadening the nation's air pattern without creating uneconomic paralleling of operations.

For the most part existing interchange arrangements along with those now pending have been created to break certain stalemates or to head off potential new route competition. Ironically the interchange approach has seldom been advanced with the initial objective of providing improved service to the public in preference to seeking new route extensions.

The Board in recent years through official statements and actions appears to have favored interchange as an instrument in effecting these necessary revisions. But its current action involving Eastern is the most positive yet expressed in this direction.

▶ **Economic Program**—For example, as part of its "Economic Program for 1949," CAB in February, 1949, instituted a series of proceedings designed to eliminate uneconomic competitive services in certain key areas. These inquiries were centered in three separate cases. They involved competitive services between Chicago and Washington, Detroit and New York, and between Minneapolis and Washington along with that of Detroit and Washington.

As a major approach, the Board is seeking to determine if interchange agreements established in the place of competitive services would eliminate duplication of operations.

In these proceedings, the Board reframed from its recent assertion that it had the power to compel airlines to enter into interchange agreements. This reluctance is probably dictated by the realization that the necessary companion measure—the cancellation of existing certificates of public convenience and necessity—may be open to serious legal question.

▶ **Cross-Country Route**—With oral arguments recently concluded, the Board will soon rule on the Southern Service to the West Coast. A CAB examiner has previously recommended that Eastern be granted an extension to the West Coast, making it the fifth transcontinental line. At the same time the interchange agreement between American and Delta was endorsed for continuation on a permanent basis instead of remaining temporary. The Board's determination in this proceeding will serve as another expression of major policy on the interchange principle.

At present American and Delta interchange at Dallas. There is considerable agreement that this service is inferior to and nowhere as desirable as one carrier one plane service. The proponents of this arrangement contend that existing and potential traffic in the area cannot support another transcontinental route. It is these basic evaluations which will determine the Board's decision in this case.

The existing American-Delta interchange arrangement was approved by the Board in August, 1949. There is no doubt that the two participating carriers were motivated to provide this service in order to counteract Eastern's pending application for a new route to the west. Subsequently, TWA and Continental filed a proposal for a Houston West Coast interchange. This was soon countered by an application filed jointly by American and Braniff to provide a Houston West Coast interchange service of their own.

Eastern, for its part, more than a year ago, advanced an interchange agreement with National to provide one plane service between Miami and Houston and San Antonio via Tampa and New Orleans. It happens that Delta has a pending application for a new route between points in the same general area.

▶ **Jockeying for Position**—It can be seen that a number of equipment interchange proposals have been filed as part of the general strategy in jockeying for position in various route proceedings.

Despite the professed desire for equipment interchanges, only four of these arrangements—three domestic and one international—have been approved by the Board.

The first attempt at interchange was made by United and Western under an agreement approved in March 1939. Provision was made for through sleeper service at Salt Lake City, eliminating change of equipment at that point for passengers traveling between Los Angeles and points east of Salt Lake City. Subsequent testimony showed that Western maintained that this was a satisfactory arrangement while United stoutly contended that this tie-up was highly unsatisfactory. In time it was abandoned.

The equipment interchange device was applied in May 1947 to settle a very difficult situation existing between Pan American Airways and Pan American Grace Airways. This arrangement brought Panagra into Miami and represented a compromise in its repeated attempts to win a direct entrance for its flights into the United States.

The equipment interchange arrangement between TWA and Delta, approved by the Board late in 1947, avoided creating new route mileage and improved passenger service. One plane service is possible on TWA's system from Detroit, Toledo and Dayton to Atlanta, Miami and other Delta points through the interchange effected at Cincinnati.

The American-Delta pact providing for interchange at Dallas has previously been noted.

In April 1949 the CAB approved an equipment interchange deal between Capital and National providing service between Minneapolis and Miami through Washington. However, actual operations in this instance have not yet been inaugurated. —Selig Altschul

No Additional Coach Operators Needed?

Examiner holds present carriers could develop low-cost mass market.

No special new coach airlines should be certificated says Civil Aeronautics Board examiner, William J Madden

Examiner Madden says the Board should reject the applications of four nonskeds for certification as scheduled transcontinental lines furnishing only coach type service The applicants are Air America, California Eastern Airways, Trans-American Airways and Great Lakes Airlines.

Madden's 102-page report considers the question Should there be any new all-coach airlines added to the U S scheduled transcontinental route pattern?

The individual qualifications of the applicants are unimportant beside this basic issue

Madden concludes

- **Lower fares are possible** on transcontinental runs. That is because the transcontinental big-city routes are the cream of the crop
- **Present operators** can probably deliver just as low coach fares as could any new applicant And the present operators don't need the spur of competition from coach "specialists" to undertake mass-market" service Madden recalls that Capital Airlines was the first regular operator to start air coach, and that was between New York, Pittsburgh and Chicago where there was little nonsked competition
- **Diversion of traffic** from regular operators would endanger the whole industry's financial health The applicants admit there would be some direct diversion But they contend that the certificated carriers will get even more "new business from increased enthusiasm for air travel" The CAB examiner after weighing this claim, concludes "No prudent person would cancel out the possibility of such dire consequences (industry losses) with the wishful argument of the applicants that they will be compensated by such an illusive reward as increased enthusiasm for air travel"

▶ **Existing Coach Services**—Examiner Madden rejects the idea of new operators coming into the picture to experiment in mass market coach service But he does not discredit the "coach experiment" as such Here is what he says about transcontinental coach service

Transcontinental Coach 1950

	AMERICAN AIR LINES		TRANS WORLD AIRLINES	
	Passengers	Load Factor	Passengers	Load Factor
Jan	2096	35	1807	44
Feb	1728	37	1997	44
Mar			3089	63
Apr	3832	85	2645	52
May	6226	89	3615	71
June	6785	94	6911	89
July	6777	91	6958	89

"The answer to the one remaining question—should the existing carriers operate coach services?—is being prepared from the cold facts of experience Full and fair experiments in transcontinental coach services are now being conducted both by American and also by TWA.

If a continuation of such services is warranted on the basis of this experience, the Civil Aeronautics Act in Section 404(A) and 1002 provides the Board with adequate powers to decide at what fare level such services should operate"

▶ **Skimming The Cream**—The four applicants plan to make money by serving only the best routes

Air America states that its proposed route is the strongest that can be devised and that if there is a stronger one then Air America made a mistake in *not finding it*

Here are the cities the four applicants would serve

- **Air America** New York Washington Pittsburgh, Cleveland, Detroit, Cincinnati, Chicago St. Louis, Kansas City Denver Albuquerque, Salt Lake City, Los Angeles, San Francisco
- **California Eastern** New York, Philadelphia, Washington, Cleveland, Detroit, Chicago, St Louis, Kansas City, Denver, Phoenix, Los Angeles, San Francisco
- **Great Lakes** New York, Philadelphia Chicago, Los Angeles San Francisco
- **Trans-American** New York, Philadelphia, Chicago, Los Angeles, San Francisco

The present transcontinental routes of American, TWA and United are built around the same backbone of U S transcontinental traffic potential That is the channel from New York via Chicago to Los Angeles and San Francisco

Here are one-company westbound services already available (eastbound flights are similar)

- **New York–Los Angeles** total daily flights, 19, one stop, 9, two or three stops, 4, more than three stops, 6
- **New York–San Francisco** total daily flights, 11, one stop, 6, more than three stops, 5
- **Philadelphia–Los Angeles** total daily flights, 3, two or three stops, 1, more than three stops, 2
- **Philadelphia–San Francisco** total daily flights, 10, two or three stops, 4, more than three stops, 6
- **Washington–Los Angeles**, total daily flights, 5, two or three stops, 1, more than three stops, 4
- **Washington–San Francisco** total daily flights, 6, one stop, 1, two or three stops, 2, more than three stops, 3
- **Boston–Los Angeles** total daily flights, 12, two or three stops, 7, more than three stops, 5
- **Boston–San Francisco** total daily flights 3 two or three stops, 1, more than three stops, 2

Existing transcontinental coach services are primarily those of American and Trans World Utilization of these services this year over the 1700 2000-mi routes shows a healthy growth in the summer

Fares are around 4½ cents a mile No accurate evaluation of the effect of fare on traffic volume is possible yet, Examiner Madden says

▶ **Fare Effect**—One rather comprehensive attempt to measure the potential coach market s size was made by California Eastern based on a correlation of Dr Donald S Watson of George Washington University The method uses three factors the gross national product, the fare and the growth of public acceptance The public acceptance growth rate is figured at a 17-percent annual increase

Examiner Madden finds that established carriers should have no higher costs on coach service than any new applicant would be likely to achieve Direct cost of operating a plane should not vary much no matter what company operates it

Computed Coach Traffic Yield

Year	Passenger Miles (000,000 omitted) 5.76 cents fare	4 cents fare	3.775 cents fare
1949	7117	14,276	
1950	8301	17,165	
1951	9680	20,019	
1952	11,314	23,341	26,553
1953	13,160	27,216	30,962
1954	15,347	31,733	36,100

(Figures are based on correlation developed by Dr Donald S Watson, of George Washington University)

Lower direct operating cost figures put forth by Air America were traceable to a lower depreciation charge, he says

As to ground cost and indirect cost, there is no exact way to allocate it Generally, however, figures supplied by the intervenors in this case, and by CAB economic studies, showed costs not far off from the estimates of the applicants, when adjustments for cutting down on services are made

And, the examiner points out, allowances must be made for a considerable degree of optimism in the estimates of Air America For example, the applicant s salary scale is 19 percent under that of AA in some classifications the number of flight crews is near the minimum that could operate the proposed schedules, leaving no leeway for sickness or vacation time No allowance is made for delays on landings and takeoffs and stacking time under instrument conditions, no allowance is made for possible maintenance costs at 11 of the 14 cities to be served, no costs are earmarked for a reservation system but a feature of Air America's proposed service is a crossing of its two routes at Kansas City so passengers may transfer from one plane to the other there

Concludes the examiner "The record will not permit a finding that the applicants can operate the services they propose at a unit cost appreciably lower than the cost at which the presently certificated carriers could operate comparable services"

Northwest's 2-0-2s Back in Operation

Complete fleet inspection of Northwest Airlines' 21 Martin 2 0 2s has "clearly shown that there are no structural deficiencies," says NWA President Croil Hunter.

The planes are back on scheduled operations after the special inspection

Northwest maintenance crews used the grounding period to make routine maintenance repairs These maintenance checks would normally be accomplished at the next periodic overhaul time

Pilot Pay

Mid-West part payment of wages by IOUs hit by CAB examiner.

Mid-West Airlines will have to pay its pilots the minimum wage scale all in cash—instead of partly in IOUs—and may have to produce $14,915 in back pay, if the Civil Aeronautics Board follows the recommendation of Examiner J Earl Cox

The carrier has been paying its pilots less than the industry minimum and making up the difference with promissory notes pending a CAB decision as to whether full-scale salaries must be paid This has been Mid-West's scale

- **First 3 months' service.** minimum, $300, maximum, $350
- **Second 3 months' service** minimum, $350 maximum, $375
- **After 6 months** minimum, $375, maximum, $400

These rates are for 70 hours flying, with additional hours paid "at the average rate per hour of the minimum rate for 70 hours flying"

▶ **Under Minimum**—This scale results in wages considerably under the minimum set in National Labor Relations Board Decision No 83

Section 401 (1) (1) of the Civil Aeronautics Act provides that pilots must be paid in conformance with that decision Under the minimum pay formula, Mid-West pilots should have been getting around $500 or more on the average But their pay was running around $350, they were underpaid by about $150 a month That's by a formula set up in the year 1934, when the cost of living was about half of what it is today

The company, on Apr 24, 1950,

asked the Board to exempt it from the requirement to pay minimum scale But it has asked CAB for enough mail pay increase to pay its pilots the full scale prescribed in the Act

►**IOUs for Balance**—Mid-West has kept a careful record of the balance it would have to pay the pilots to meet the proper scale On Aug 11, Mid-West agreed with the Air Line Pilots Assn to issue promissory notes to the pilots, payable July 31, 1952 These notes cover all that is due pilots to bring their pay up to the minimum wage scale The notes carry no interest until the due date

Examiner Cox's opinion follows decision of the board to institute a proceeding "to determine whether or not Mid-West has violated the Civil Aeronautics Act"

Mid-West argues that the promissory notes covering the balance due each pilot put the company in full compliance with the requirements of the Act And the company says the acceptance of these notes by the pilots constituted payment and is an acknowledgement by the pilots of settlement in full

►**Examiner Rebuttal**—Examiner Cox says judicial interpretation of minimum wage statutes requires 'the payment in cash or its equivalent of the prescribed minimum compensation"

And, Cox adds, "the legislative history of the Civil Aeronautics Act indicates an intent to provide a minimum wage as a simple matter of justice to men engaged in a highly skilled and inherently dangerous occupation, to bolster the national defense by attracting men of superior ability to the industry and to decrease the hazards of air transportation by relieving the minds of the pilots of any financial worry"

Cox says minimum wage or other compensation prescribed by welfare statutes must be paid employes in cash or by negotiable instrument payable at par, except as otherwise permitted by statute

►**Notes Bear No Interest**—The trouble with the promissory notes Mid-West gives its pilots is that they are not negotiable at their face value They bear no interest so a bank would discount the note, leaving the pilot with less than his due from Mid-West

And the fact that the pilot has accepted the notes does not close the case Cox cites several cases providing that "in the absence of a bona fide dispute as to liability between an employer and employe, the employe cannot effectively waive his right to any part of the minimum wage prescribed by statute"

The examiner concludes that Mid-West has violated and is continuing to violate the provision of section 401 (1) (1) of the Act This is contrary to the public interest and if permitted to continue "would or might lead to the breakdown of the statutory minimum wage by other air carriers

CAB can order Mid West to cease and desist from violation of the Act if this becomes advisable

If the Board agrees with its examiner, Mid West will have to pay its pilots the full minimum wage scale starting with the date of the order On previous underpayments the Board probably could not force Mid West to pay the full minimum The Board can suspend the line's certificate, or order it to cease and desist underpayment of its pilots That is all But the pilots could get the money through the courts

Underpayment of pilots constitutes a theoretical threat to safety of airline operation the Act implies So the Board would appear to be under some obligation either to hasten the mail pay negotiations or else suspend Mid-West's certificate

Irish Profit Up

Aer Lingus, Irish Air Lines, made a profit of 115,000 pounds the first half of its fiscal year, up 27,000 pounds or about 25 percent over a year ago

Total revenue of the line this past half has expanded 107,000 pounds—to 825,000 pounds Expenditures rose only 75,000 pounds

Aircraft Light Modifications Due

The aircraft lights now in use on air line planes are due for a change following tests at the Indianapolis Technical Development and Evaluation Center of Civil Aeronautics Administration Lights for jet planes will be 500 times brighter than the present systems

Present flasher systems on conventional planes should be changed to provide for flashing wingtip and fuselage lights at 80 flashes per minute Flashes of red and white tail lights should be 40 per minute

United Air Lines plans to modify its entire fleet to conform with this new standard, evaluated by Air Line Pilots Assn, Air Transport Assn CAA and others

High intensity lights developed for jet planes are visible at 20 to 30 miles This gives the pilots of 500-mph planes at least the one minute warning considered as a safe minimum The lights CAA tested were supplied without cost by Thomson Corp., which developed them in accordance with CAA design recommendations Testing and development will continue next year

Another experimental high intensity sweep-beam light has been developed by Luminator, Inc, of Chicago

MCA Salesmen

Mid-Continent Airlines is using nine of its co pilots as salesmen

Faced with the prospect of furloughing the co pilots, the line took this way of simultaneously boosting sales and keeping the pilots on the payroll

The fliers wear their regular uniforms They confine their solicitation to discussions of the company's flight operations and how these contribute to safety and schedule dependability

Idea for the special use of pilots is credited jointly to Vice Presidents Jugh W Coburn traffic, and John A Cunningham operations

EAL Resumes Dividend Policy

With payment of 25 cents a share Dec 18, Eastern Air Lines resumes its former 50 cent annual dividend policy interrupted in 1947 by the industry slump

President E V Rickenbacker says the 50-cent dividend is back again because "unsettled conditions have been substantially eliminated and the steady, healthy growth in gross revenues as well as net profits amply justify the resumption of dividends at this time"

Eastern has a $40-million new equipment program underway It includes 35

twin engine 40 passenger Martin 4 0-4s to replace DC 3s, and 14 92 passenger Super Constellations on order for use on longhaul express flights Delivery of both starts next summer and is scheduled for completion by the end of the same year

This will give Eastern a 70 percent increase in seat mile capacity, after sale of the present DC 3s from the fleet

President Rickenbacker says the National rearmament program is giving air travel "substantial stimulus" and "a degree of stability which it has not enjoyed since the end of World War fl"

Net earnings after adjustment for increased 1950 income tax the first nine months are 30 percent over 1949 And says Rickenbacker, "indications point to a continuance of such an increase during the coming winter vacation season"

KLM Orders Super Connies

Keener competition for trans Atlantic air passenger business is forecast as a result of Royal Dutch Airlines order for a number of the new Super Constellation 1049Cs The airline has announced officially that five of the big new transports have been ordered from Lockheed, although reliable sources have it that nine planes are involved in the deal KLM expects to have the 1049C in service in 1952 Although no contract price has been given out, the basic Super Connie sells for approximately $1 5 million plus spares

The Dutch airline is having the planes fitted out for 66 passengers A new pressurization system will maintain a sea level cabin pressure up to 12 500 ft and 8000 ft altitude up to 30 000 ft Maximum cruise speed at maximum average weight will be 324 mph, and maximum speed at the same weight, 368 mph KLM's Super Connies will have the new Wright Turbo Cyclone compound engines which will permit considerable increases in payload or range The 1049C is stressed to take turboprop engines when they become available commercially

The new Super Connie is enjoying considerable popularity, at present Lockheed has orders for 50 from Eastern Air Lines, KLM, the Air Force and Navy The first production plane is expected to fly next April

American Orders Three More DC-6Bs

American Airlines is ordering three more 52 passenger DC 6Bs from Douglas Aircraft Co

This brings American's DC 6B fleet on order to 14 planes Total AA fleet will be 155 planes 14 DC 6Bs, 45 standard DC-6s, 4 DC 6 air coaches, 79 Convair Liners, and 13 DC-4 air freighters

Price of the new DC 6Bs, with spare parts, is about $3 5 million, This brings total cost of the 14 DC 6Bs to about $16 5 million Douglas deliveries of DC-6Bs to American are scheduled to start in February.

Tiger's Freight Doubled Since June

Common carriage airfreight business of Flying Tiger Line has doubled since June 1, and the line made over half a million dollars net profit in the third quarter

This, for a young airline without subsidy, makes the airfreight picture glow more invitingly than ever before though the Korea airlift is partly responsible

It is especially significant at a time when top military and airline officials are trying to hatch a plan to set up a mammoth airfreight industry in this country (see AVIATION WEEK Nov 27)

Here is the record of Flying Tiger Line this summer

▪ **Pacific airlift** operations of Flying Tigers are with leased planes, so operating profit on this war job is all clear over and above regular operations.

▪ **Foreign contract** business has increased The line is operating a large contract movement between Europe and Australia This is under a firm commitment that will keep it busy until Jan 1, and perhaps longer.

▪ **Customer maintenance** volume has increased considerably in the past few months Flying Tiger is building a new hangar at its main base in Burbank This will double present capacity Prospects for increasing volume of customer service maintenance appear very good

The company is busy seeking overhaul contracts from the military on World War II planes coming out of mothballs

► **New Planes**—Flying Tiger bought 18 Air Force C-46Fs Sept 30 for $509,000 This will enable the line to release the planes it is now leasing from other firms.

It will make Flying Tiger the largest all-cargo fleet in the world, except military For the past several months the line has been getting more business than it could handle with existing equipment

There will be some expense in modifying and licensing the 18 new C-46s but the planes have been little used since they were built for the military by Curtiss Wright during the war

► **Income Figures**—Operating profit of the Flying Tiger Line the third quarter was $895,213 on total operating revenues of $3,496,780

Operating expenses break down thus way flying, $1,323,339, ground operations, $414,529, maintenance, $505,935; cost of service sales, $93,421; traffic sales, advertising and publicity, $84,392; general and administrative, $129,524, depreciation and amortization, $50,425.

Other deductions of $48,354 and income taxes of $256,700 leave a net profit of $590,158.

Net worth (equity capital and surplus) of the company Sept 30 was $2,286,004. Working capital (current assets less current liabilities) came to $1,185,289.

SHORTLINES

▶ **Braniff International Airways**—Company's net profit the first nine months of 1950 is triple last year's—$768,952 compared with $215,887. Load factors are running the highest since 1945. President T. E. Braniff says the full year may possibly be the best in history, even exceeding 1945. The late months of the year are best for Braniff, he says.

▶ **Bharat Airways, Ltd.**—Airline has extended its Far Eastern service from Bangkok to Singapore, using Douglas Skymasters. Planes leave Calcutta just before midnight on Fridays and return Sundays.

▶ **Capital Airlines**—Carrier's five newly acquired Constellations are running a load factor of over 58 percent, compared with less than 54 percent for Capital's regular fare flights in other types (first 15 days November). Capital's Connie runs are 3 roundtrips daily, Washington to Chicago, some stopping at Detroit. Washington-Minneapolis, New York-Chicago via Cleveland and Detroit, New York-Cleveland shuttle.

▶ **British Overseas Airways**—Company has not yet resumed New York-Bermuda service due to equipment shortage. BOAC dropped the flight in March, saying the company had been losing half a million pounds sterling a year for several years.

▶ **Central Airlines**—Feeder is applying to CAB for seven more cities to serve: Junction City, Fort Riley, Manhattan and Topeka, Kan.; Falls City and Omaha, Neb.; and Council Bluffs, Ia. Company already serves 25 cities in Texas, Oklahoma and Kansas.

▶ **Chicago & Southern Air Lines**—Carrier pays a 30-cent dividend Dec. 15. Net income the first ten months is $650,818 or $1.28 a share. This compares with $598,161 or $1.17 a share a year ago.

▶ **Civil Aeronautics Board**—CAB has approved three Cuban air carriers for operation between Havana and Florida cities, for limited periods. The Board amended the foreign air carrier permit of Aerovias "Q" to transport persons, property and mail between Havana and Key West until Feb. 10, 1955, and between Havana and Tampa for three years. Compania Cubana de Aviacion has authorization between Havana and Miami to Apr. 4, 1954. The Board issued a new permit to Servicios Aereos allowing it to carry property and mail (no people) between Havana and St. Petersburg for three years.

▶ **Colonial Airlines**—Company has started its new schedule giving one stop service between Washington and Ottawa. Time saving on this trip compared to the old schedule is 1 hr. 25 min. Intermediate stop is Syracuse, N. Y.

▶ **LAV**—The Venezuelan government airline plans a weekly roundtrip Maracaibo, Venezuela, to Lima, Peru, as soon as it gets landing rights from Peruvian government. Presently, the route is flown by the Peruvian flag line Andes. Its route is via Panama with an overnight stop there. LAV would fly the route overland nonstop.

▶ **La Nica**—The Nicaraguan line (Lineas Aereas de Nicaragua) gets four planes with purchase of FANSA (Flota Aerea Nacional) for about $285,000.

▶ **International Air Transport Assn.**—IATA reports international airline traffic continues on the upgrade, judged by August IATA clearing house volume of $13,495,000—compared with $12,649,000 a year ago. IATA is now reporting clearing house returns in terms of the $2.80 pound, instead of the old $4.03 rate.

▶ **International Civil Aviation Organization**—ICAO has held the second meeting of its Middle East Regional Air Navigation group at Istanbul. The group drew plans for long range voice radio, which will allow any pilot to speak directly to the flight information centers at Karachi, Bombay, Teheran, Basra, Bahrein, Khartoum, Istanbul, Cairo, Cyprus and Athens. The meeting also drew plans for installation of Instrument Landing System (ILS) and Distance Measuring Equipment (DME) at many Middle East airports. ICAO has also extended use of high speed automatic tape relay equipment for flight plan clearance within a few minutes throughout the Middle East.

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WHAT'S NEW

New Dictionary

The expanding engineering market in South America has created engineering vocabulary problems, but fortunately, there is a basic engineering dictionary to help solve these problems

Louis A. Robb, a civil engineer, has compiled and recorded technically correct engineering terms in Spanish and English. The published result is the **Engineers' Dictionary (Spanish - English and English-Spanish)** available from John Wiley & Sons, Inc.

As could be expected from the editor's background, the parent fields of engineering—civil, mechanical and electrical—are heavily covered. Television nomenclature receives a lot of attention—but words and terms like jet propulsion, turbojet and aileron are missing.

The dictionary does not have thumb indexing.

Engineer's Dictionary is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. Price is $12.50.

High Society

First branch of the Society of Licensed Aircraft Engineers in North America has been organized at Gander Airport, Newfoundland, under the chairmanship of Robert Walsh.

SLAE's purpose is to provide an exchange of information between members on international airline planes and problems, and to disseminate members' experiences to manufacturers and operators. SLAE is established in 26 countries. Inquiries can be addressed to M. Staple, Publicity Manager, Society of Licensed Aircraft Engineers, Gander Airport, Gander, Newfoundland.

New Addresses

Adel division, General Metals Corp., aircraft and industrial hydraulic valve equipment maker, has opened new offices in the New York area in the Stevens Bldg., 42 Third Ave., Mineola, Long Island. The firm's previous offices at Stamford, Conn., have been closed. Perry Barker, Adel's eastern representative, heads the Mineola office. E. M. Storer, Jr., previously with Glenn L. Martin Co., has joined Adel as a sales engineer.

Steiner Plastics Manufacturing Co., Inc., is moving to a new plant at Pratt Oval, Glen Cove, Long Island, N. Y. The move will give Steiner production space of 75,000 sq. ft. Present office at 47-30 33d St., Long Island City, will be maintained until the end of 1951.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—DECEMBER 4, 1950

EDITORIAL

Rail and Air Casualty Rates

TWA's president, Ralph Damon, wrote this recently to the magazine, Railway Progress:

"Comparisons of safety records perhaps are in questionable taste, but ICC and CAB statistics show that rail passenger casualties (fatalities and injuries) per 100 million passenger miles in 1948 were 5.2 times as great as for the airlines."

Missile Coordination

With formation of the Office of Guided Missiles, under the widely respected K. T. Keller, of Chrysler Corp., the Department of Defense has taken an important step toward coordinating vital work by Army, Navy and Air Force.

Keller will report directly to Defense Secretary Marshall, and has already set to work preparing a unified program for the future.

As AVIATION WEEK pointed out in two editorials on this page weeks ago, the lack of coordination and planning of the three services in missile research was rapidly becoming a national scandal. There was little knowledge in one service of what the others were doing, and each group had its own ideas—some very fuzzy, indeed—as to what its goals should be.

In some aviation activities competition between the services can stimulate progress, while unification can act as a stultifying influence. But in the tremendously important missile field, where so many basic facts are still unknown, some kind of clearing house and overall planning agency is essential. This overall agency then can direct the individual services in unduplicated research most needed in their own particular methods of fighting.

Why Raise Coach Fares?

Do you remember a year or so ago when the Civil Aeronautics Board called top executives of the domestic airlines to Washington and advised them one way they could stop the trend toward bigger losses was to raise fares?

A few did, but American Airlines refused to go along, so the lines that followed CAB's unofficial advice had to drop their fares again a few weeks later. Higher fares quickly siphoned off passengers from lines like United that raised rates, to carriers like American, that didn't.

Led by promotionally minded American Airlines, originators of the family fare plan, the industry then began cutting first class fares in earnest, and starting air coaches.

What happened? Read the latest announcement from the Air Transport Assn. for yourself.

The 16 trunk lines expect to break all records for passengers this year by some 20 percent more passenger miles.

This is almost 20 percent more than the previous record, in 1949. It will be the second-largest year to year increase in airline history, ATA points out.

In the first 10 months of 1950, passengers flew more mileage than they did in the entire 12 months of 1949. The estimate for November is 25 percent higher than for November last year. December may run 20 percent over last December.

But what about profits? This airline business has always been able to hang up all kinds of new traffic records, but red figures were more likely to pop up on the profit and loss sheets than black ones. Well, unofficial estimates of industry profits for 1950 now run as high as $50 million, or better than double the $23½ million earned last year.

Industry spokesmen attribute this big 1950 gain not only to good weather and better business conditions generally. They give credit to large scale air coach services and special travel rates such as the family fares.

With this in mind, please join us in trying to fathom the reason for the Civil Aeronautics Board's pronouncement a few weeks ago that coach fares must go up a half cent a mile in 1951.

This Board, that was so very wrong on this fare subject a short time ago, said it based its decision to raise fares on surveys and studies. But so far it has not had the courage to release these studies and subject them to critical examination of the press and public.

We repeat—with the latest announcement by the ATA in mind—how do you explain the Board's arbitrary fare action, especially in light of the Civil Aeronautics Act's emphatic instruction to the Board to foster and promote air transportation?

Such inexplicable actions as this, and others holding down new coach services and restricting others which had already started—do nothing to dissipate a suspicion that somewhere in high places there is a conspiracy against letting the air coach show it can be made to pay.

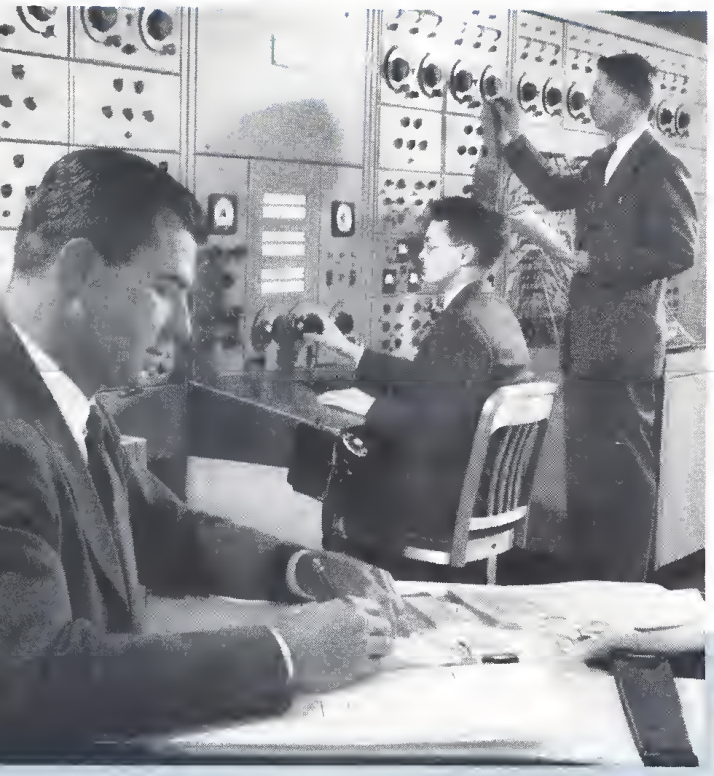
Could it be that there are still a few highly placed aviation people who do not want any surcease from the present mail pay system even with its onerous government regulation and extra drain on the taxpayer?

Are these enemies of the air coach afraid that mass air transportation will bring a downward revision of air mail rates? Are they afraid to risk standing on their own feet in depression periods? If so, why do they lack the courage to fight air coach in the open? And why do they give it lip service in public if they secretly are fighting it?

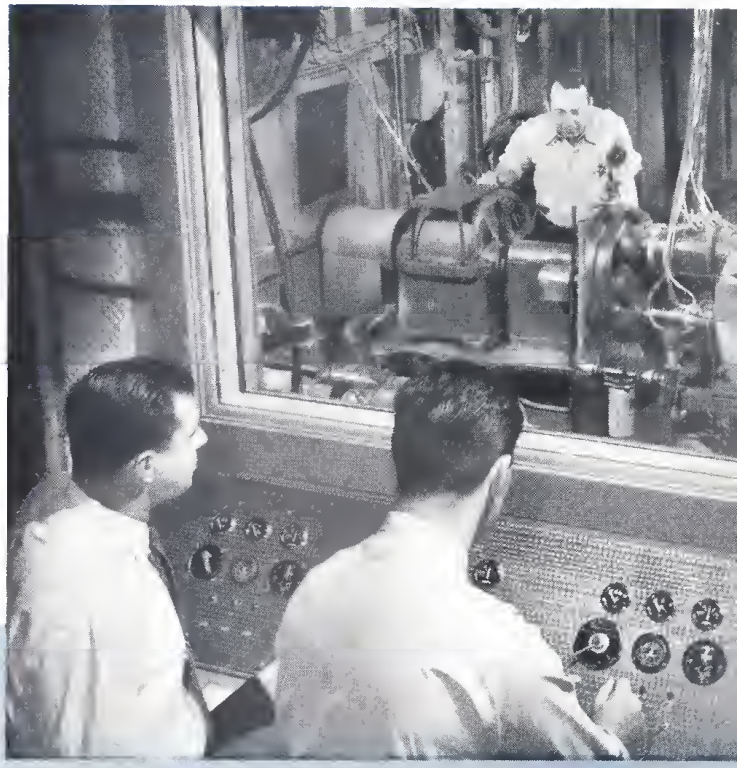
Such action as the CAB's strange order add potency to the rather widespread opinion that the Board is still woefully weak in standing up to outside influences and pressures.

—Robert H. Wood

Flight testing an idea



Complete electrical systems far any given aircraft can be simulated an this netwark analyzer.



Radial-type engines help this test stand duplicate aircraft power systems for testing purposes.

Even ideas are flight tested at General Electric. Both before and after an aircraft electrical system is built, G-E's aviation divisions check it out under actual operating conditions to save you expensive "de-bugging."

Your power distribution system, for example, is first "flown" on the analyzer. Electrical circuits for your plane are cranked into the board and the idea is worked over until the analyzer OKs it.

A model then gets a long rugged workout in the Aircraft Systems Test Lab to iron out final kinks. When design is "right," production begins. Finally, individual component parts are tested before installation in your aircraft.

Project engineers are chosen for experience as well as scientific "know-how." Pilots, navigators, flight engineers, military and transport, are represented. George Phillips, for instance, shown "flying" a distribution network, is an ex-Air Force maintenance officer.

This combination of theoretical analysis and practical testing by men who know aviation problems means trustworthy electrical systems without extensive "de-bugging" after installation.

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